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## Ethnological and Biogeographical Significance of Pottery Sherds from Nissan Island, Papua New Guinea

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### ACKNOWLEDGEMENTS

The analysis of ceramic materials presented in the first section of this paper was undertaken during the 1972-1973 academic year when I was an undergraduate participating in the Research Training Program under the direction of John Terrell, Department of Anthropology, Field Museum. I spent the subsequent year at Field Museum carrying out further research, and writing the manuscript presented here.

I wish to thank Steve Nachman for collecting the Nissan ceramic materials discussed in this paper, and Jim R. Specht for generously allowing the use of his unpublished doctoral dissertation. Joyce Tani translated the German ethnographic materials, Zbigniew Jastrzebski prepared the illustrations, and Reeva Wolfson provided much encouragement. Finally, I am indebted to John Terrell who read the manuscript in its many forms. Without his frankness and endless patience as teacher and editor this work could not have been written.

### INTRODUCTION

Ethnologically, the small Pacific Islands called Nissan and Pini-pel are the northernmost points in the Solomon Islands archipelago. In a paper on "Geographic Systems and Human Diversity in the Northern Solomons," John Terrell (1972) has referred to them as

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PLATE 1. "Village scene, Island of Nissan, off Buka, Solomon Islands." [Plate 40 from: A. B. Meyer and R. Parkinson (1900): *Album of Papua-Types, II*, Dresden: Stengel & Co.] (Photo by Herta Newton).



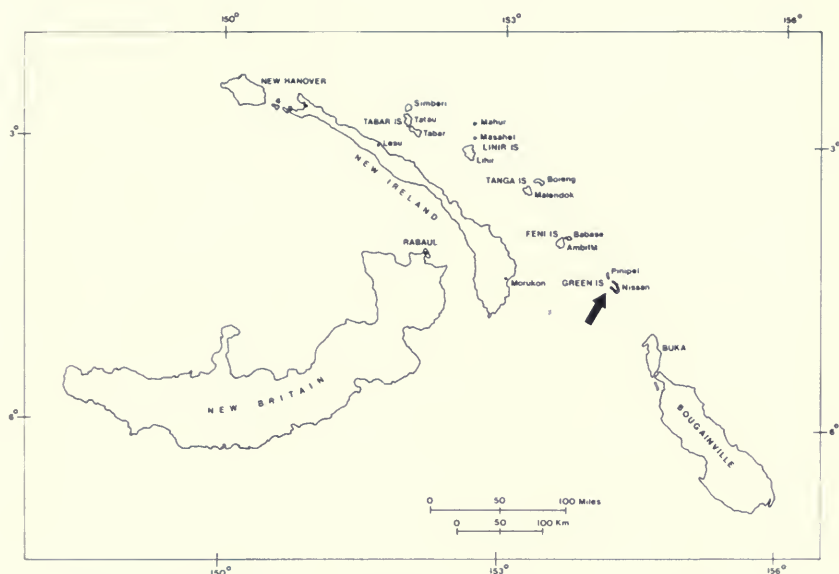


FIG. 1. Map of the Bismarck Archipelago-North Solomons region.

“stepping-stone islands” because they are located, along with the Feni Islands farther north, between the larger islands of New Ireland in the Bismarck Archipelago and Buka, in the Solomons, which are otherwise separated by more than 100 miles of open sea (fig. 1).

In their book, *The Theory of Island Biogeography*, Robert MacArthur and Edward Wilson (1967), have suggested that stepping-stone islands play an important part in the dispersal of species between “major islands” by influencing the frequency and ratio of species exchange. They (1967, p. 133) suggest that if habitable stepping stones are in existence, even of the smallest size, such islands will be used, and not bypassed, in the exchange of species between major island areas.

At the beginning of their discussion on the role of stepping-stone islands, MacArthur and Wilson (1967, p. 123) ask a question which is applicable to any study of human migration and cultural exchanges among the Pacific Islands: “By how much does a stepping-stone that has been colonized add to the overall dissemination rate to a third, farther island?”

It is well known ethnologically that New Ireland and the northern Solomons are dissimilar in race, language, and culture. Terrell (1972 and pers. comm.) has suggested that the theory of stepping-stone islands propounded by MacArthur and Wilson should have impor-

tance in reconstructing the role played by Nissan, Pinipel, and the Feni Islands in regulating the frequency and effects of human movement and interaction between these major land areas.

The question raised by MacArthur and Wilson can be re-phrased with reference to the prehistory of Nissan and Pinipel: to what extent have these intermediate islands influenced the frequency and ratio of biological and cultural exchanges between New Ireland and the northern Solomons, and therefore also the evolution and maintenance of ethnological, biological, and linguistic similarities and differences between these two larger land areas?

While it should be possible to answer this question by carrying out research along several different lines, a direct approach would be to ask what archaeological evidence exists on the problem. 1) Is there archaeological evidence for human movement and interaction between the areas under consideration? 2) How far back can that evidence be traced? 3) What is the range of information available, and what might be inferred about the nature and patterning of movement and interaction thus documented? 4) Can inferences about the direction, frequency, and ratio of contacts and exchanges between the islands in question be drawn from the archaeological evidence? 5) How well do these archaeological inferences agree with ethnographic testimony? 6) Does a reconstruction of Nissan, Pinipel, and the Feni Islands as stepping-stones between New Ireland and Buka fit the patterns of movement and interaction which might be predicted on the basis of theoretical island biogeography? 7) What additional evidence should be obtained during future research to increase the correspondence between fact and theory?

With regard to the first of these questions, archaeologists have found pottery sherds on a number of the islands in the Nissan region. Sherds have been recovered from Lesu Village and Balof Cave on the east coast of northern New Ireland (Clay and Terrell, pers. comm., 1971; Lewis, pers. comm., 1973), and at Morukon Village on the southeastern New Ireland coast (Nachman and Sheridan, pers. comm., 1970; Specht, pers. comm., 1973). Sherds have also been collected on Ambitle Island off southern New Ireland (White, 1972; White and Specht, 1973; Specht, pers. comm., 1973), and from Buka and Sohano Islands in the northern Solomons (Specht, 1969). Finally, they have been found on Nissan Island itself.

The main body of this paper deals with the issues raised by the second and third questions posed above, and constitutes a style analysis of pottery rim sherds from Nissan collected in 1971 by



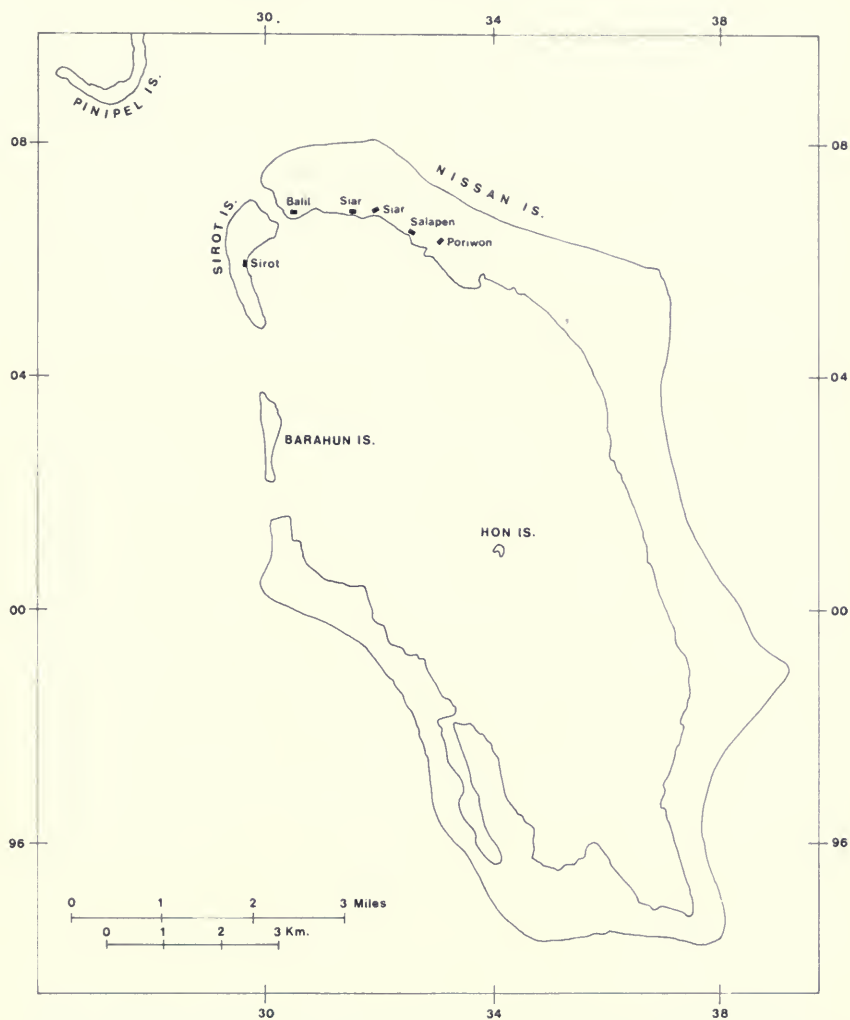


FIG. 2. Map of Nissan Island showing modern village locations where the Nachman Collection was obtained.

Steve Nachman at the request of John Terrell, while Nachman was a graduate student in social anthropology at Yale.<sup>1</sup> A ceramic sequence for Nissan Island has not yet been established, for no archaeological excavations have been conducted there. However, obvious similarities, both in stylistic elements and in clay materials

<sup>1</sup>The actual specimen collecting was done by Nissan islanders, who obtained 3,770 rim and decorated body sherds from 105 named localities at five major village areas in the northern part of Nissan (fig. 2).

between the Nissan sherds in the Nachman Collection and sherds obtained in 1967 by Jim Specht, and described in his (1969) doctoral dissertation, are easily observable upon inspection.<sup>1</sup> In addition, the ethnologists Krause (1906) and Blackwood (1935) report that ceramic pots, manufactured on Buka, were traded by the islanders to Nissan, at least during historic times. Therefore, in the discussion to follow, Specht's work on the prehistoric sequence of Buka Island will be referred to often as the most probable basic ceramic chronology for Nissan. Indeed, the extremely close correspondence between the ceramics of these two islands will make it possible to suggest several useful alterations in Specht's reconstructed sequence for Buka.

Following the presentation of this style analysis and a discussion of the inferences which may be drawn from it concerning the ceramic traditions which produced the pottery vessels represented by the Nachman Collection, this study will conclude by taking a few initial steps to expand the inquiry beyond the archaeological information, in order to examine the broader questions asked above referring to the biogeography of the Nissan islanders and their neighbors to the north and south. Because information about this part of the Pacific is currently inadequate, such a concluding discussion can only be exploratory. Nonetheless, the attempt to explore theoretical issues which do not deal strictly with ceramic chronology and style will make it possible to ask several new questions about the nature of population interaction in the Nissan region, which should be relevant to any further archaeological work done in the area.

## CERAMIC ANALYSIS

### THE BUKA SEQUENCE

In his dissertation, Specht subdivides his excavated and surface collections into a series of seven major ceramic styles, dating from about 500 B.C. (ANU-272: 2480 BP  $\pm$  140) to A.D. 1967 (Specht, 1969, p. 214), listed here in chronological order: *Buka*, *Sohano*, *Hangan*, *Malasang*, *Mararing*, *Recent*, and *Modern*. Specht's reconstruction of Buka prehistory begins with the appearance of *Buka Style* pottery, sometime around 500 B.C. According to Specht this pottery, "represented by a small number of sherds, often poorly preserved and small" (1969, p. 193), was the work of people of the

<sup>1</sup> According to the geologist William Dickinson (Dickinson and Kaplan, in preparation) the tempers of sherds from Nissan and Buka are nearly identical.

Lapita ceramic tradition (1969, p. 306) which has been identified throughout the Southwestern Pacific during the first millennium B.C. (Ambrose and Green, 1972). He (1969, p. 321) postulates a second settlement of the island sometime about 250 B.C. "by people possessing a different ceramic tradition, and possibly a different material culture in general," these being the people of the *Sohano* ceramic tradition. He (1969, p. 321) states that a third settlement occurred around A.D. 1000-1200 when the *Mararing* ceramic style was introduced. He has expressed the belief that a number of social customs were introduced at this same time which continued in practice down to the late prehistoric and historic eras, when pottery of the *Recent* and *Modern* styles was produced.

Pottery sherds which resemble the *Malasang*, *Mararing*, and *Recent* styles and have similar paste and temper compositions can be identified in the Nachman Collection. Since Specht was able to deal with his specimens in stratified contexts, his definitions and detailed observations on these three later stages in the Buka sequence are useful in organizing the Nissan sherds, and are critical elements in discussions appearing later in this paper concerning the probable chronological order of recognized sherd groups within the Nachman Collection.

### Malasang Style

In brief, the *Malasang Style*, as originally defined by Specht, consists of diagonal and wavy-band design motifs done in broad comb-scored lines (fig. 3f-h), which have been executed by dragging the fluted edge of an *Arca* (or similar) shell along an unfired and still plastic clay surface. Everted lips (fig. 3f-g) and simple lips (fig. 3h) are common, and lip profiles are modified with notched and comb-scored motifs (Specht, 1969, pp. 205-206). Specht (1969, p. 206) reports finding sherds with both broad comb-scoring characteristic of *Malasang Style* pottery, and with stick punctations (fig. 3c) characteristic of the later *Mararing Style* pottery, at site B.P. 9A/I in the upper part of layer V, a layer transitional from the *Malasang* to the early *Mararing Style*. Also in connection with layer V at this same site, he (1969, p. 206) reports finding a number of relief-decorated sherds, the motifs of which are quite different than those of the *Malasang Style*. Specht (1969, p. 206) mentions the possibility that the first group might be derived from a transitional-style phase, while he suggests that the relief sherds "could represent another source of pottery."

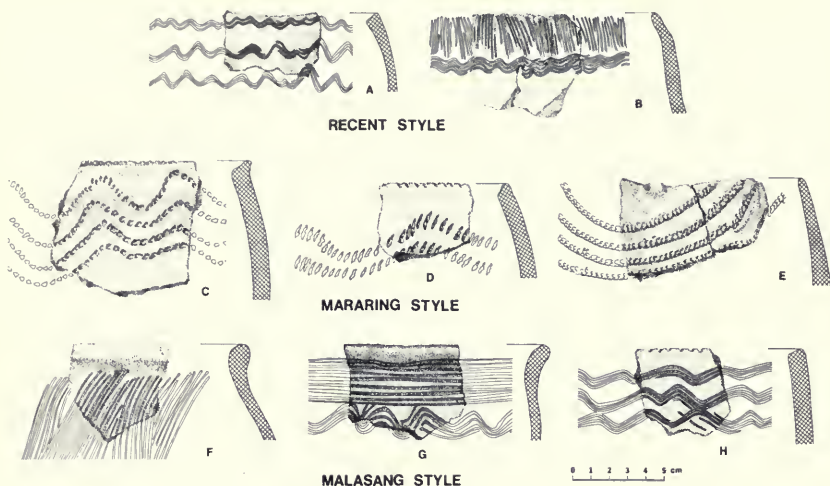


FIG. 3. Sherd specimens from Nissan Island depicting the last three phases of the Buka ceramic sequence defined by J. R. Specht.

### Mararing Style

According to Specht, the decorations found on pots of his *Mararing Style* have been executed by means of both stick punctation and shell-edge impression, and the motifs take the form of wavy-bands (fig. 3c-e). Lip profiles are simple, channelled, and bevelled (fig. 3c, d, e) (Specht, 1969, pp. 208-210). The *kepa* (fig. 3e), a ceremonial vessel with pouring lips, used historically in manufacturing a pudding called *menak* (Blackwood, 1935, p. 400)<sup>1</sup>, made its first appearance in Specht's (1969, pl. IV-18) excavations on Buka in the *Mararing* layer IV at site B.P. 9A/I.

### Recent Style

During the *Recent Style* in Specht's reconstruction there is a return to the comb-scoring decorative technique (fig. 3a, b) used earlier in the *Malasang Style*. A transition from the decorative techniques of stick punctation and shell-edge impression of the *Mararing Style* to comb-scoring is postulated by Specht (1969, p. 210), though he did not excavate sufficient evidence to show that the style change was a smooth transformation. Specht (1969, p. 211) has noted that a wide range of comb-scored motifs appear during this style.

<sup>1</sup>*Menak*, which is prepared only by men, is presented at ceremonial occasions, and is a mixture of taro, with either coconut oil or crushed *Canarium* nuts (Blackwood, 1935, pp. 274-275).

Specht (1969, p. 209) builds a case for the uniqueness of the *Mararing Style*, specifically pointing to the apparent sudden adoption of shell-edge impression technique, which results in the total exclusion of the broad comb-scoring so characteristic of the previous style. He reports that pottery sherds decorated by means of shell-edge impression contain tempering materials that are unlike those used in the *Hangan*, *Malasang*, and *Recent* styles. He (1969, p. 310) also points out that other culture traits, such as crushed red earthen pigment, pounders, and anvils, appear for the first time in *Mararing Style* pottery layers. He associates pounders and anvils with the process of crushing *Canarium* nuts for manufacturing *menak* and implies that the appearance of these new traits in layers yielding shell-edge impression decorated ware confirms his inference that a new social complex had been introduced on to the island at this time. Specht (1969, p. 311) suggests that the "elements of social structure associated with *menak* were either introduced by the makers of the *Mararing Style*, or reached their present state of development during this style."

Specht looks for parallels for the *Mararing* shell-edge ware in the Papua, New Caledonia, and New Hebrides areas. In this endeavor, he is following a suggestion by C.A. Key (1969, p. 217), who proposes in his report, *Mineralogy and Petrology of the Buka and So-hano Pottery* (given as an appendix to Specht's dissertation) that the shell-edge impressed *Mararing* ware, with its unusual temper, is the work of "newcomers" to Buka. In sum, both Specht and Key clearly imply that there was a rather large-scale migration to Buka at the beginning of the *Mararing* era.

## ANALYTICAL OBJECTIVES

As already stated, trade between Nissan and Buka has been reported in historic times by Blackwood and Krause, both of whom describe the exchange of pigs, shell money, pots, and other items between the islands. Specimens in the Nachman Collection, described below, indicate that at very least the pottery trade observed historically must date back to the time of Specht's *Malasang Style* phase, if not before. If the Nissan sherds do come from vessels imported from Buka Island, then it seems likely that the Nachman Collection may be studied analytically with two objectives in mind which pertain both to the archaeology of these islands and also to the broader questions previously asked about prehistoric population interaction between Nissan and Buka.



First, if Buka is the source of the vessels represented in the Nachman Collection, it is reasonable to propose that the Nissan evidence can be used to test the definition and interpretation of the later phases of Specht's Buka ceramic sequence. Admittedly, this suggestion appears circular in nature. However, a test of Specht's reconstruction of the later phases in Buka ceramics, utilizing Nissan evidence, should lead to one of three conclusions: a) The Nissan sherds will fit Specht's reconstruction closely, thus confirming his sequence and attesting to a Nissan-Buka pottery trade; b) the utilization of Specht's reconstruction of the Buka sequence to define the Nissan evidence will be impossible, with the result that either the hypothesis of trade of Buka pots to Nissan dating back to at least the *Malasang Style* must be rejected, or Specht's reconstruction of the Buka evidence must be rejected; or c) Specht's basic reconstruction of the Buka ceramic sequence can be used to define the Nissan specimens; the trade hypothesis is therefore supported, and Specht's basic sequence is confirmed. However, points of disagreement between the evidence from both islands can be observed and alterations in Specht's sequence can be suggested, which may be tested during analyses of new archaeological evidence in the future.

Second, the style analysis of Nissan potsherds presented here may also be used to discern whether a) there is evidence in favor of a continuous stylistic development in ceramic vessel form and in decorative techniques and motifs during the periods represented in the Nachman Collection, or whether, b) any specimens are significantly different from the others to warrant looking, along with Specht, for their origins elsewhere in the Pacific. Specifically, if it is possible to:

1. pin-point outstanding lip profile shapes that are shared between recognized groups of sherds in the Collection;
2. trace lip decorations that are shared;
3. isolate common decorative body motifs; and
4. find indications of the use of the shell-edge impressed decorative technique in pottery which corresponds to the buka *Malasang* ware;

then there would be evidence in favor of an unbroken sequence of stylistic developments in the Nissan materials, and by inference in the Buka pottery tradition, dating back (in keeping with Specht's other observations) to the *Sohano Style*. Such a conclusion would be at variance with deductions made previously by Specht. On the other hand, should common attribute trends not be demonstrated to exist in the Nissan materials, then an unbroken stylistic development might appear unlikely, and Specht's suggestion that the *Ma-*

*raring Style* may have been introduced by new migrants to Buka would emerge again as a likely conclusion.

Before dealing with these questions of style relationship, however, the procedure by which the formal ceramic attributes used in this analysis were established and tabulated will be discussed, and the attributes of the resulting recognized Nissan groups examined.

## PROCEDURE

In order to conduct an analysis of the Nissan pottery sherds the following steps were taken:

1. Rim sherds (sherds defined by Shepard (1956, p. 245) as being pieces from "the margin of the vessel orifice") were categorized according to the methods used to decorate the vessels;
2. A tally of lip profiles, lip decorative modifications, and body motifs was made, site by site, using a standardized attribute nomenclature;<sup>1</sup> and
3. The statistical results were standardized into percentages when such a step seemed appropriate.

In the following discussions, each attribute recognized during analysis will be treated separately, in order to map out as clearly as possible the movements of each attribute through each of the proposed sherd groups, noting when specific ceramic treatments increase and decrease, and at what points they overlap.

## OBSERVATIONS

Tabulation of attributes resulted in the establishment of the following attribute code:

1. A division by the decorative techniques presumed to have been used by the pottery-makers was used to establish four numerically large groups of sherds which correspond to known Buka ceramic styles, and four numerically small ones (fig. 4), the placement of which in the sequence is unclear. They are designated as:

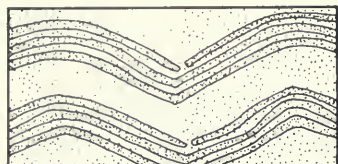
### MAJOR DIVISION

Broad Comb-Scoring . . . . .	162 sherds
Stick Punctuation . . . . .	296 sherds
Shell-Edge Impression . . . . .	200 sherds
Wavy-Scoring . . . . .	169 sherds

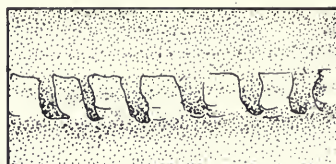
### MINOR DIVISION

Notched Relief . . . . .	8 sherds
Notched Relief with Incised Lines . . . . .	6 sherds
Incised Lines . . . . .	9 sherds
Scored Lines with Punctations or Shell-Edge Impressions . . . . .	6 sherds

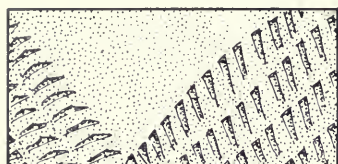
<sup>1</sup>Sherds from separate numbered localities were pooled into their respective sites, because otherwise some samples for study would contain two sherds, others 60. Pooling of samples was also done because no map information was available on the locations of the individually numbered sampling localities.



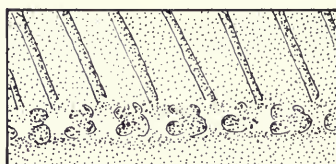
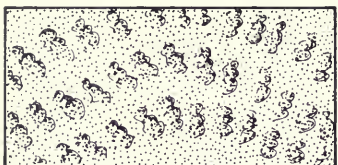
BROAD COMB-SCORING



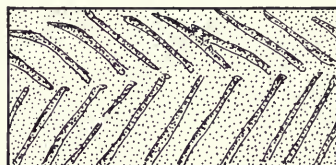
NOTCHED RELIEF



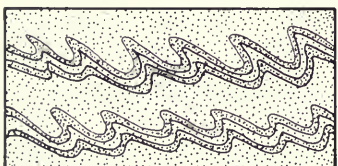
STICK PUNCTATION

NOTCHED RELIEF WITH  
INCISED LINES

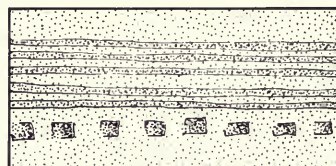
SHELL-EDGE IMPRESSION



INCISED LINES



WAVY-SCORING



SCORING WITH PUNCTATIONS

FIG. 4. Decorative technique categories.

2. Seven lip-profile shapes, designated here as *LP classes*, were isolated during analysis and given numbers (fig. 5):

3. Six methods used to decorate the lip area of the pottery vessels were recognized, designated *LM classes*, and given numbers (fig. 6):

1. No Decoration
2. Stick Notching
3. Shell Notching
4. Comb Scoring
5. Incision
6. Punch and Drag

4. Seventeen decorative motifs observed on the exterior vessel walls of rim sherds were identified, designated *BM classes*, and given numbers (fig. 7). It should be noted that these motifs have

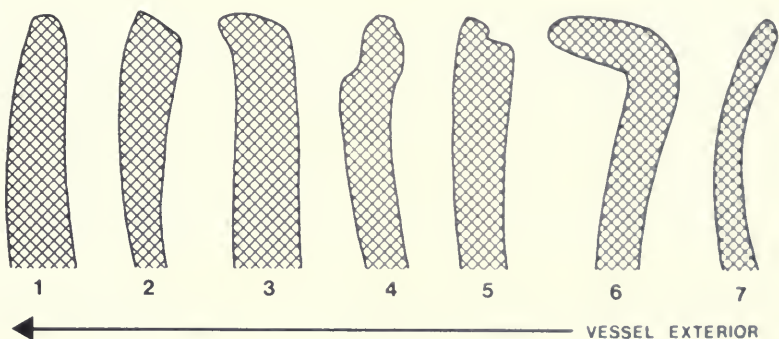


FIG. 5. Lip profile categories.

been classified according to the design present, without taking into account the *method* of execution. Motifs which appeared only once in the collection are covered in the section entitled *Miscellaneous*.

#### NISSAN CERAMIC ATTRIBUTES (MAJOR DIVISION)

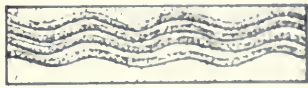
The statistical results collected by tallying attributes of the *Major Division* categories appear below (fig. 8), standardized into percentages and recorded in bar-graph form. Those attributes particularly important to a given group are also pin-pointed.

*Broad Comb-Scoring* (corresponding to the *Buka Malasang Style*). The rim sherds decorated by the technique of broad comb-scoring (162 sherds) (fig. 4) exhibit the following attributes:

1. They are characterized most sharply by a strong everted lip (LP-6), which accounts for 53 per cent of the pieces; 33 per cent of the sherds have simple LP-1.



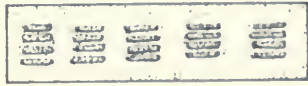
1



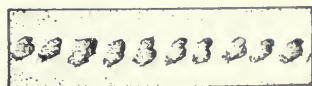
4



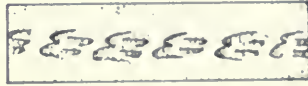
2



5



3



6

FIG. 6. The six methods used to decorate vessel lips.

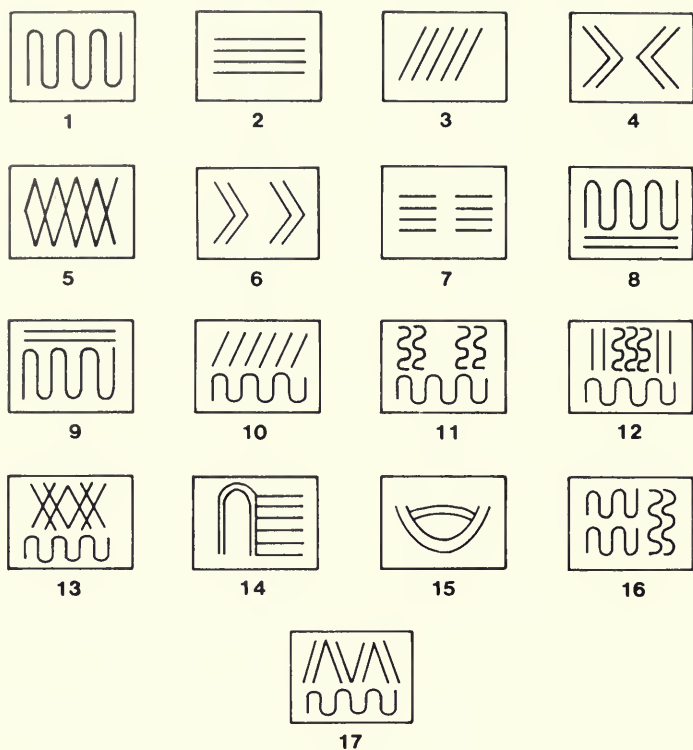


FIG. 7. Motifs of body decoration.

2. 50 per cent of the lips lack modification (LM-1), while 38 per cent have wavy-scoring (LM-4).

3. Wavy-bands (BM-1), found on the exterior vessel wall, account for 65 per cent of the body motifs, 20 per cent of the sherds are of the BM-8 or BM-9 classes.

4. 39 per cent of the pieces come from the Balil area, 32 per cent from Siar, and 24 per cent from Salepen (fig. 2).

*Stick Punctuation* (corresponding to the *Buka Mararing Style*). The following attributes were observed on rim sherds exhibiting the stick punctuation decorative technique (296 sherds) (fig. 4):

1. LP-1 and LP-3 are the most common lip profile shapes, occurring 44 per cent and 31 per cent of the time, respectively.

2. 53 per cent of the lips are modified with stick notching (LM-2), and 34 per cent of them are unmodified (LM-1).

3. BM-1 appears 54 per cent of the time, and BM-17 also occurs with some frequency (20 per cent).

4. 38 per cent of the sherds come from Siar, 22 per cent from Balil, and 15 per cent from Salepen.



*Shell-Edge Impression* (corresponding to the *Buka Mararing Style*) Shell-Edge impression decorated rim sherds (200 sherds) (fig. 4) of the Nachman Collection have the following attributes:

1. LP-1 occurs 41 per cent of the time; LP-3 is also common, occurring 24 per cent of the time.
2. Shell notching (LM-3) accounts for 53 per cent of the sherds in this group, while 39 per cent of them are plain.
3. BM-1 is the mode, as 59 per cent of the pieces bear this motif.
4. 57 per cent of the sherds come from Siar, 16 per cent from Balil, and 15 per cent from Salepen.

*Wavy-Scoring* (corresponding to the *Buka Recent Style*) The rim sherds characterized by the wavy-scoring decorative technique (169 sherds) (fig. 4) exhibit the following attributes:

1. LP-1 occurs 64 per cent of the time; LP-2, which is bevelled, occurs 15 per cent of the time.
2. 45 per cent of the lips are modified with LM-6, 40 per cent are wavy-scored (LM-4), and 14 per cent are undecorated (LM-1).
3. A large number (77 per cent) of the sherds have BM-1 on them.
4. 30 per cent of the sherds come from Salepen, 27 per cent from Balil, and 20 per cent from Siar.

## NISSAN CERAMIC ATTRIBUTES (MINOR DIVISION)

The discussion of the next four groups necessitates a detailed account of individual sherd attributes in order to properly place them in sequence. The size of the individual samples does not allow for standardized data into percentages; nevertheless, these sherds display significant attribute combinations worth examination.

### *Notched Relief*

Attributes observed on notched relief rim sherds (8 sherds) (fig. 4) in the Nachman Collection are as follows:

1. All sherds have the strong everted lip profile (LP-6).
2. While there are no really complete motif sequences preserved on any of the sherds, the motifs seem to be notched bands placed in arcs and in horizontal lines.
3. Lip modifications consist of plain lips (LM-2, LM-5), combinations of LM-2 and LM-5, of LM-3 and LM-5, and one sherd has an arc of shell-notched relief running from the lip down its interior surface, with some evidence of a similar line arcing in the opposite direction.

### *Notched Relief with Incised Lines*

The rim sherds combining the technique of notched relief with incised lines (6 sherds) (fig. 4) have the following attributes:

1. All fall into the LP-6 category.
2. All have incised lines which run in diagonals, sometimes in chevron patterns, combined with notched relief bands going horizontally across the sherds.

## MAJOR DIVISION

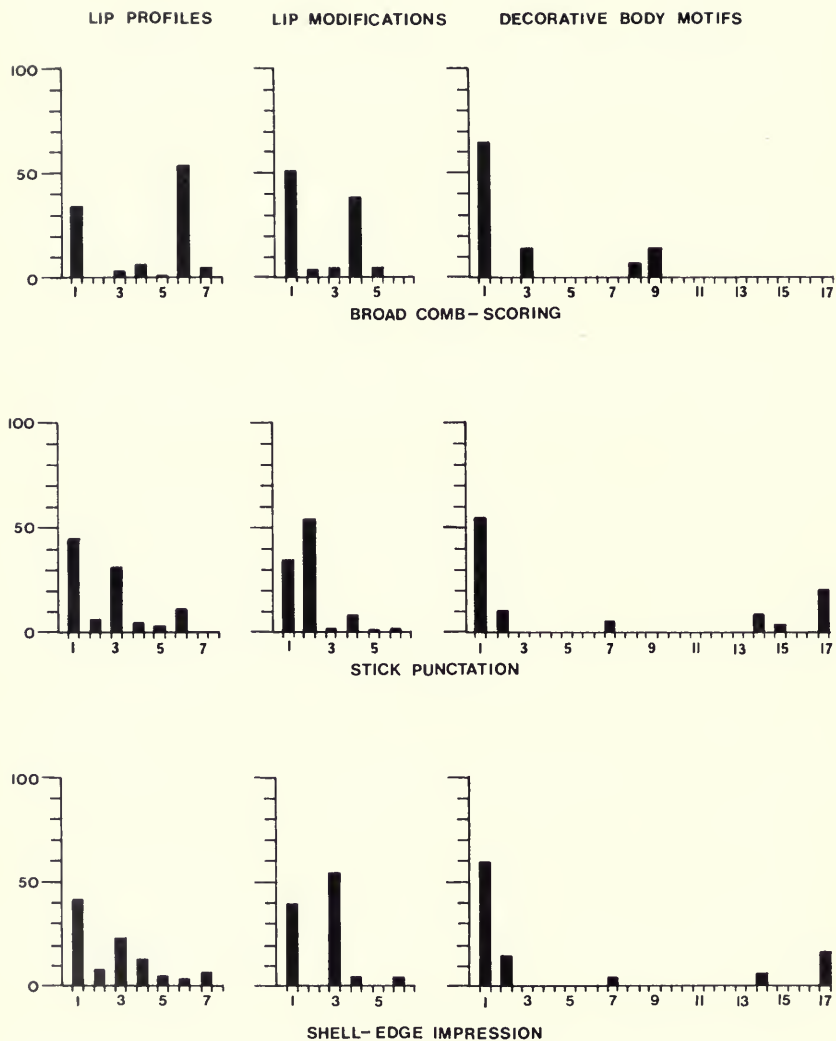
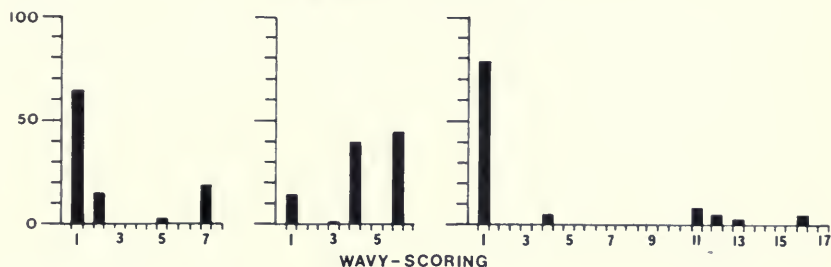


FIG. 8. Graphs illustrating the distribution of ceramic attributes among the recognized sherd divisions.

## MAJOR DIVISION



## MINOR DIVISION

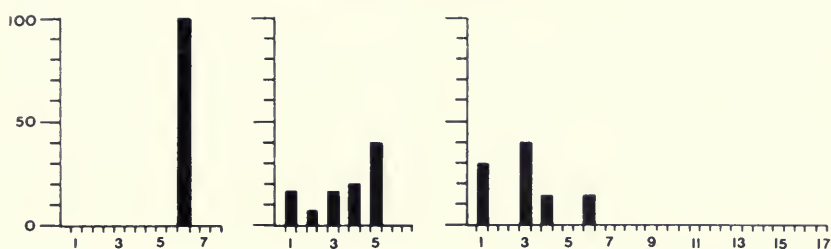


FIG. 8. (continued)

3. The lip modifications are varied and run from multiple rows of LM-2, or of LM-5, to single rows of LM-2, LM-3 combined with scoring, and a V-shaped incised pattern. One sherd has incised diagonal lines, with punctated points, combined with two rows of incised relief, all running from the top to the interior of a stick-notched lip.

*Incised Lines*

The Nissan rim sherds which are decorated by the techniques of incised lines (9 sherds) (fig. 4) exhibit the following attributes:

1. All have LP-6.
2. The body motifs consist of chevrons, diagonal, and counter-diagonal lines, and an erratic cross-hatching motif.
3. Six of the lips are unmodified, there is LM-5, LM-2, and a sherd with incised lines running along its lip top.

*Scoring with Punctations and Shell-Edge Impressions*

The attributes found on rim sherds having motifs which were executed by the combined techniques of scored lines with stick punctation and shell-edge impression (6 sherds) (fig. 4) appear below:

1. All have LP-6.
2. Body motifs:

Two of the pieces have shell-edge impressions running horizontally across the sherd bodies, with scored lines running diagonally from that point downward, in one instance forming a V. Another sherd has the same motif as the one just mentioned, done with stick punctations instead of shell-edge impressions.

Three of the sherds have diagonal scored lines slanting in opposite directions, in one instance bounded by a V of shell-edge impressions.

3. The lip modifications found are LM-5, LM-6, rows of LM-4, a chevron pattern, and a set of non-descript scored lines.

## RELATIONSHIP BETWEEN THE MINOR DIVISIONS AND THE BROAD COMB-SCORING GROUP

As already stated, when he excavated on Buka Specht (1969, p. 206) found a seemingly wide variety of sherds in one stratified layer, layer V at site B.P. 9A/I. These sherds are similar to pieces from the various Nissan *Minor Division* groups. In view of this information the four *Minor Division* categories will be treated as a single group, in order to investigate the possibility that they represent one unit. In the accompanying tables (fig. 8), the sherds have been tallied according to lip profiles, lip decorative modifications, and body motifs; the results have been standardized into percentages and put into bar-graph form.

As revealed by the graphs, all *Minor Division* sherds have everted lips (LP-6), and a high proportion of them (40 per cent) have the LH-5 attribute. While the decorative body-motif data reveal little, there is an overlap in the techniques the potters used to execute the motifs, suggesting an inter-relationship between the groups of the *Minor Division*, an idea which is supported by the lip profile and lip modification clustering.

The predominant occurrence of LP-6 is evident in both the *Minor Division* groups just combined and the *Broad Comb-Scoring* group. This profile is also evident in the *Stick Punctuation* and *Shell-Edge Impression* groups, but it is by no means the norm (in fact, it is the exception in the last two groups). LM-5, an important attribute of the *Minor Division*, occurs in 40 per cent of those pieces, and while it is not a dominant attribute of the *Broad Comb-Scoring* group (6 per cent of such sherds have that attribute), only two examples of LM-5 are found in the *Stick Punctuation* group, and none in the *Shell-Edge Impression* and *Wavy-Scoring* groups.

According to the Nissan attribute analysis there is, therefore, reason to suspect a relationship between the *Minor Division* sherds and those of the *Broad Comb-Scoring* group. Specht's (1969, p. 206) stratigraphic data of layer V, site B.P. 9A/I, confirm this suspicion, for as already stated it was in this layer, which Specht classifies as a

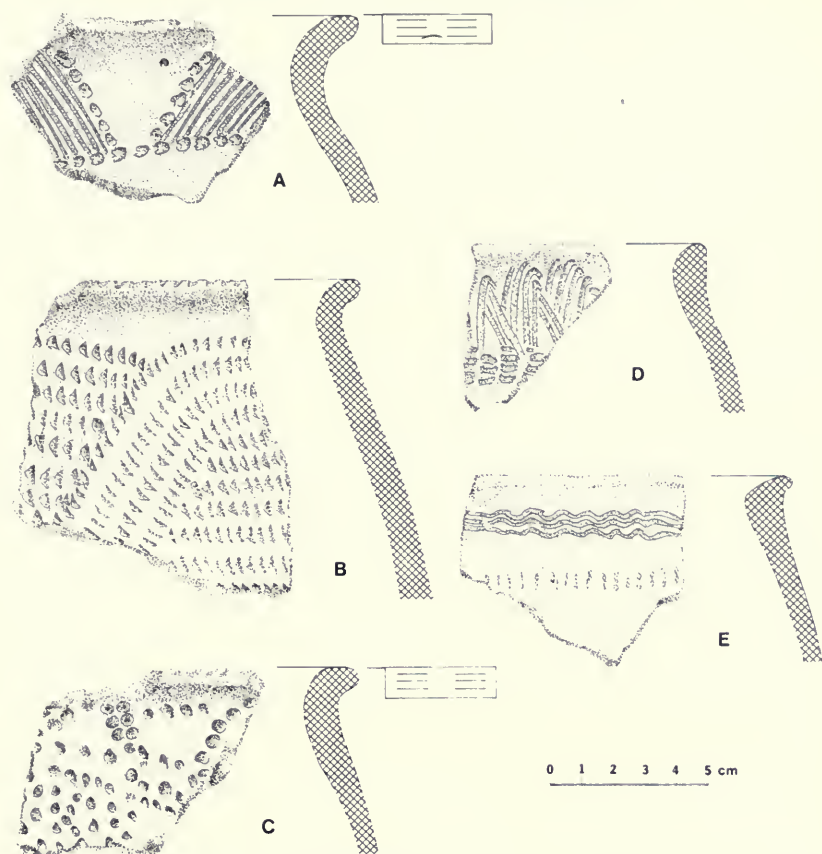


FIG. 9. Nissan sherds that appear to be transitional between recognized ceramic groups.

transitional *Malasang-Mararing* layer, that he found sherds combining broad comb-scoring with stick punctation, and incision with relief.

In addition, in his plate labelled *Malasang Late Comb Styles* (1969, pl. XI-36) there is a sherd which is almost identical to one in the Nissan collection: it combines comb-scored lines with stick-punctated borders. The difference is that the Buka sherd (1969, pl. XI 36, k) has punctations on a relief band, while the Nissan piece (fig. 9a) has the punctations occurring directly on the vessel wall. A notched relief sherd is listed in the same plate, as is a piece exhibiting diagonal scoring combined with shell-edge impressions; both sherds bearing a strong resemblance to the sherds of the Nissan *Minor Division*.



On the basis of the predominance of LP-6, LM-5, and Specht's discovery of sherds in a *Malasang*-related layer which are decoratively similar to those of the Nissan *Minor Division*, a relationship between the *Minor Division* and the *Broad Comb-Scoring* group, which corresponds to the *Buka Malasang Style*, seems quite plausible. Later discussion of the relationship between the *Broad Comb-Scoring* and the *Stick Punctuation* and *Shell-Edge Impression* groups will explain the logic of this placement further.

## STICK PUNCTATION AND SHELL-EDGE IMPRESSION WARE

A comparison of the bar-graphs recording the attributes which characterize each of the Nissan groups reveals a close similarity of attributes and their frequencies for the stick punctuation and shell-edge impression decorated ware, and raises the question as to their relationship. Indeed, Specht (1969, p. 208) classifies stick punctuation and shell-edge impression decorated Buka pieces as variants of the *Mararing Style*. The attributes which characterize the Nissan examples of such sherds will be examined further in an effort to discern whether the Nissan specimens exhibit attributes so similar to one another that they can be classified as belonging to the same style.

A Cartesian graph (fig. 10) demonstrates the number of attributes shared between two groups, in this case *Stick Punctuation* and *Shell-Edge Impression*, as well as those absent from one or the other. That is, attributes which are shared equally fall near the line which bisects the angle; attributes not shared occur along one of the angle rays. *Stick Punctuation* and *Shell-Edge Impression* share equally all lip modifications but LM-5 (*Stick Punctuation* has two such sherds, while *Shell-Edge Impression* has none), and all lip profiles but inverted LP-7 (which is found in 7 per cent of the *Shell-Edge Impression* sherds and not at all in the *Stick Punctuation* group). They do not share BM-15, but have similar frequency ranges of BM-1 (54 per cent *Punctuation*; 59 per cent *Shell-Edge Impression*) and BM-17 (20 per cent *Punctuation*; 16 per cent *Shell-Edge Impression*).

The difference between the stick notching (LM-2) and shell notching (LM-3) frequencies, which is observed when comparing the *Stick Punctuation* and *Shell-Edge Impression* groups, could be taken as an indication of a disparity between the two groups, as these attributes almost completely replace one another. However, when

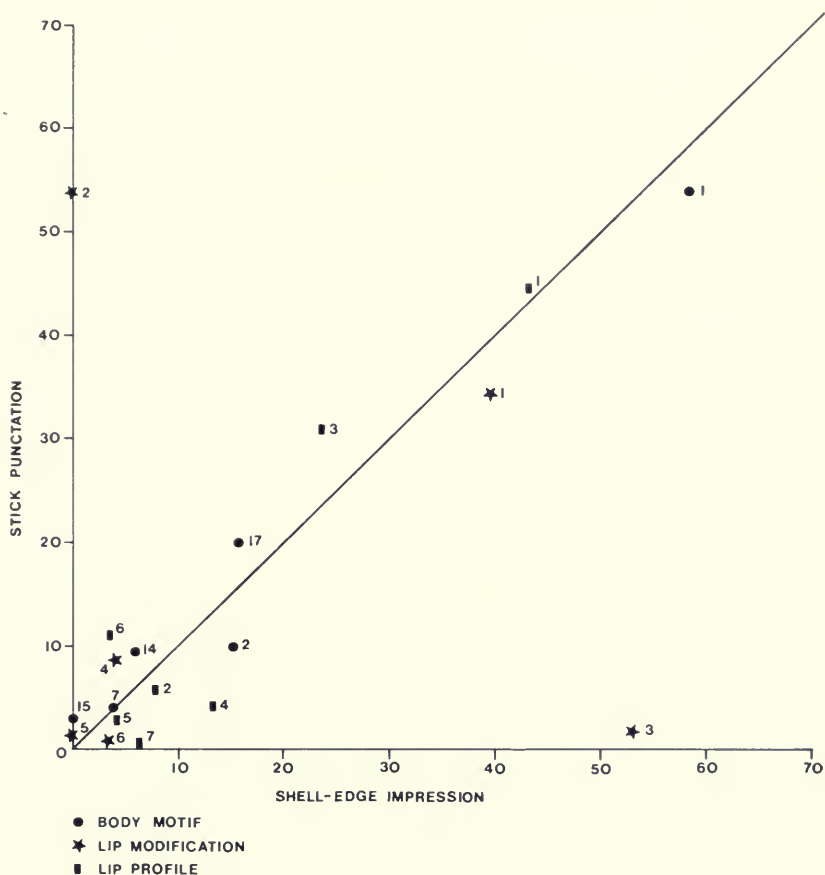


FIG. 10. Graph depicting the sharing of attributes between the *Stick Punctuation* and *Shell-Edge Impression* sherd groups.

establishing the attribute nomenclature, a distinction was made as to the decorative techniques used to decorate the lip areas, in order to observe how lip decorative techniques correlated with vessel body wall decorative techniques. As might be expected, the technique used to execute the body decoration was usually the same one used when decorating the lip profile. Stick notching and shell notching are both classifications of a form of notching the lip, and over 50 per cent of each of the *Stick Punctuation* and *Shell-Edge Impression* sherd lots have this characteristic. Thus the disparity between stick-notching and shell-notching frequencies may be more apparent than real.

In view of this analysis of the Nissan materials, in which it has been shown that, with the exception of LM-5, LP-7, and BM-15, the *Stick Punctuation* and *Shell-Edge Impression* groups exhibit the same attributes in similar frequencies, it would seem that stylistically they both belong to one and the same group, and they represent only style variants.

## STYLE RELATIONSHIPS

At this point the attributes of the Nissan *Major Division* and *Minor Division* groups have been recorded, the possibility that the *Minor Division* categories should be considered as one unit having a relationship to the *Broad Comb-Scoring* group has been suggested, and sherds decorated by the techniques of stick punctuation and shell-edge impression have been judged to be variants of one style. The question now arises as to the relationship between these established groups.

### *Broad Comb-Scoring, Stick Punctuation, and Shell-Edge Impression*

By means of a triangular co-ordinate graph, attributes shared by three groups, those held exclusively by a group, or absent from a given group, can be charted. On graphs of this variety, a point falling within the triangle, away from the sides, indicates that the attribute it represents is shared by all three groups. A point falling close to the center of the triangle indicates that the three groups share the attribute represented in more or less equal amounts. A point occurring along one of the legs of the triangle reveals that the attribute represented is absent from the group opposite that leg, and when a point falls on one of the vertices of the triangle, this means that all of the sherds having that trait belong exclusively to the one group after which the vertex is named.

When the attribute statistics for the *Broad Comb-Scoring*, *Stick Punctuation*, and *Shell-Edge Impression* groups are plotted on such a triangular graph (fig. 11), it is possible to make the following observations:

1. With the exception of the bevelled and inverted lip profiles (LP-2, LP-7), all lip profiles are shared to varying degrees by the three groups. A large percentage of each of the groups compared on the triangular coordinate system has simple LP-1, and though not occurring in great numbers, LP-5 with its inner channel also appears in all three categories. The everted lip profile (LP-6), an important attribute of *Broad Comb-Scoring*, is represented in the *Stick*

*Punctuation* pieces by sherds which are similar to those placed in Specht's (1969, pl. XI-43) *Miscellaneous* table. Other than the fact that the surfaces of such sherds are completely covered with punctations in arc and horizontal line formations (fig. 9 b), they bear no attributes which disqualify them from the *Stick Punctuation* category.

2. The three groups share equal numbers of unmodified lips. Stick notching (LM-2), the mode of *Stick Punctuation*, appears in 5 per cent of the *Broad Comb-Scoring* pieces, and shell notching (LM-3), the mode of *Shell-Edge Impression* ware, also appears in 5 per cent of the *Broad Comb-Scoring* pieces. Wavy-scoring (LM-4) is an attribute found in both *Stick Punctuation* and *Shell-Edge Impression* groups, and is the norm of the *Broad Comb-Scoring* group. As already stated, LM-5 is closely associated with the *Broad Comb-Scoring* sherds, but there are examples of it in *Stick Punctuation* pieces.

3. BM-1 is dominant in each of the groups and is shared equally. BM-8 and BM-9 only appear in the *Broad Comb-Scoring* group, while BM-7 is absent from this group. However, the basic arc-and-

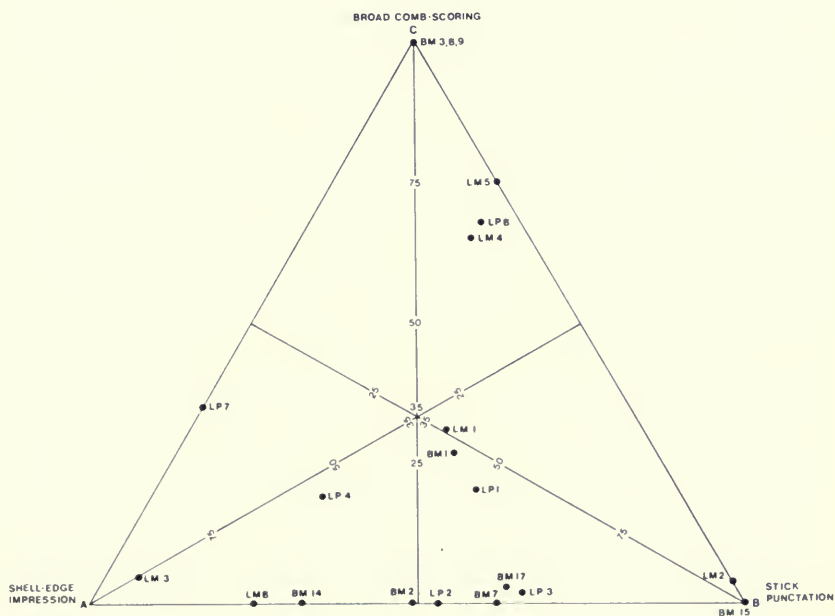


FIG. 11. Triangular co-ordinate graph comparing attribute frequencies in the *Shell-Edge Impression*, *Stick Punctuation*, and *Broad Comb-Scoring* sherd groups.

band theme is evident in all of these decorative body motifs, none is distinctly different from the others for it to be classified as unrelated.

There are two sherds from the Nachman Collection which exhibit combinations of attributes which add to the understanding of the relationship between the three groups being discussed. One, a stick punctated sherd (fig. 9c), has LM-5 along with LP-6. The only attribute this sherd displays which is not characteristic of the *Broad Comb-Scoring* group is the technique used to decorate the vessel walls.

The second sherd (fig. 9d) has an unmodified lip, together with BM-1 executed in the comb-scoring technique characteristic of the *Broad Comb-Scoring* group. Three imprints appear in a horizontal line under the scored wavy band. These imprints were executed by making short strokes with the edge of a shell. This technique could be transitional between two decorative techniques already examined, dragging the shell-edge on the plastic clay surface in a comb-like fashion, and making simple shell-edge impressions by jabbing the tool edge into the soft clay. It should be noted that the short-stroke technique exhibited on this broad comb-scored sherd also appears as a form of notching on the relief notched pieces of the *Minor Division*, which as been associated with the *Broad Comb-Scoring* category.

Earlier mention was made of a number of shell-edge impressions appearing on sherds of the four *Minor* groups. Shell-edge impressions appear as borders for incised lines, as notchings on relief, and as lip modifications. A similar situation exists with the stick punctations. Also mentioned was the fact that a Nissan sherd and one from Specht's collections differ only in that the punctations on the Nissan sherd were executed directly on the clay body, while the punctations on Specht's piece were executed on a relief band.

All these observations suggest that shell-notched relief and stick-notched relief decorated pottery vessels were direct predecessors to pottery in which shell and stick notchings were executed directly on the vessel walls. This transition might have occurred when people realized that through simple stick punctations and shell-edge impressions they could achieve the same decorative effect that they got when they built relief bands and then notched them, only with less effort involved.

The sherds exhibiting incised and scored lines bordered by shell and stick notching might also be transitional pieces, as they are



decorated by the combined techniques of broad comb-scoring, shell-edge impression, and stick punctation. Specht (1969, p. 206) mentions this possibility specifically in terms of sherds which have combinations of scoring and stick punctations. This idea is re-inforced by the fact that, as already mentioned, in a *Malasang-Mararing* transitional layer, Specht found sherds similar to the Nissan pieces being discussed, and attributes such as LM-2, LM-3, LM-5, LP-6, and BM-1 are shared between the *Broad Comb-Scoring*, *Stick Punctuation*, and *Shell-Edge Impression* groups, which correspond to the *Malasang* and *Mararing* styles of the Buka sequence. In other words, the sherds of the Nissan *Minor Division* may then be seen as examples of a phase transitional from the *Broad Comb-Scoring* to the *Stick Punctuation* and *Shell-Edge Impression* groups.

*Stick Punctuation, Shell-Edge Impression, and Wavy-Scoring*

In his statements concerning style relationships, Specht notes that there appears to be a development from the late stages of the *Mararing Style* into the *Recent Style*. In this regard, there are a number of sherds in the Nachman Collection which indicate a transition from the *Stick Punctuation* and *Shell-Edge Impression* ware into the *Wavy-Scoring* ware.

Again using a triangular coordinate system, the attributes of the *Stick Punctuation*, *Shell-Edge Impression*, and *Wavy-Scoring* groups are compared (fig. 12). The attributes which are shared are BH-1, LP-1, LP-5, LM-3, LM-4, and LM-6. An analysis of those attributes not shared by the *Wavy-Scoring* group and the *Stick Punctuation*, *Shell-Edge Impression* groups reveals that many of the decorative body motifs contained in the *Wavy-Scoring* group are variations of the BM-1 wavy-scoring theme, and attributes such as LP-6 and LM-5 are traits shared between the *Broad Comb-Scoring* and *Stick Punctuation*, *Shell-Edge Impression* groups.

One Nachman Collection specimen graphically depicts the *Shell-Edge Impression*, *Wavy-Scoring* attribute overlap (fig. 9e). The sherd has an unmodified lip with the bevelling characteristic of LP-2. A band of small wavy-scoring appears under the lip. Below that, in a faint but unmistakable row, appear shell-edge impressions. Here then is a sherd exhibiting two ways of handling the same tool, each result associated with a different decorative ceramic group. John Terrell (verbal comm., 1973) reports finding the same kind of transitional sherd in a surface collection from the Vakao Site, on the northeastern corner of Bougainville Island.

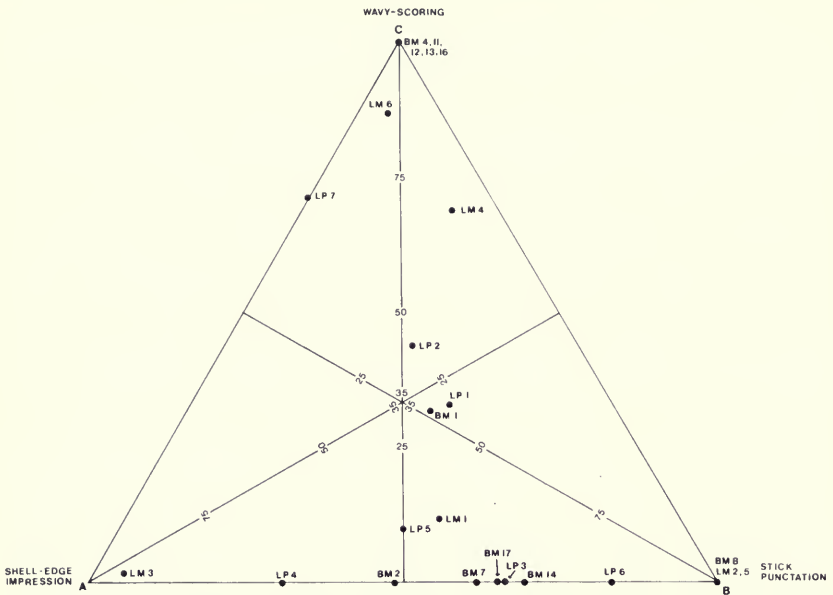


FIG. 12. Triangular co-ordinate graph comparing attribute frequencies in the *Shell-Edge Impression*, *Stick Punctuation*, and *Wavy-Scoring* sherd groups.

There seems to be little reason to doubt a style development between the *Stick Punctuation*, *Shell-Edge Impression* groups and the *Wavy-Scoring* group. Basic attribute characteristics of each group are found in residual but definite numbers in the other groups; there is shell-edge notching (LM-3) on the lips of sherds having wavy-scoring on their walls, while shell-edge impression decorated sherds have everted lip profiles (LM-6). The development of an important lip profile, bevelled LP-2, which emerges in the *Stick Punctuation*, *Shell-Edge Impression* groups and becomes an important *Wavy-Scoring* attribute, can be traced.

## MISCELLANEOUS

A number of sherds in the Collection have not been included in this discussion because of some uncommon traits they possess. They will be examined here to provide a complete picture of the Collection's range of sherds.

1. Two sherds (fig. 13a) have simple unmodified lips and ladder-like motifs incised on the outer vessel walls. A comparison with sherds illustrated in Specht (1969, pl. XI-35, a, b) reveals that they are identical to sherds which he places in the *Buka Malasang Early Comb Incised* substyle.

2. Two sherds (fig. 13b) have horizontal markings under the lip, characteristic of the Buka *Early Sohano Style*. However, their lips are everted. One shows evidence of broad comb-scoring under the *Sohano*-like markings. In view of the lip profiles and the scoring, these sherds have been classified in the *Broad Comb-Scoring Group*. Specht's (1969, pl. XI-33) *Malasang* listings contain sherds having similar attributes.

3. Five sherds (fig. 13c) have the pinched pouring-lip characteristic of the *kepa*. Three are punctated pieces, one has shell-edge impressions, one is wavy-scored. The decorative markings are in simple bands. One shell-edge impression decorated piece has a lip modification, LM-3. The sherds may be ascribed with little hesitation to the *Stick Punctuation*, *Shell-Edge Impression*, and *Wavy-Scoring* groups.

4. One sherd has an unmodified lip (fig. 13d), an everted lip profile, and a body motif consisting of incised triangles placed on horizontal incised lines. There is also a body sherd with a similar motif. Judging from the lip profile and the incised method of decoration, the sherds belong to the *Broad Comb-Scoring* group.

5. Four sherds (fig. 13e) have profiles best described as being in the form of commas, fat at the top, everted, thinning at the lip body junction. Two of these pieces have heavy shell-edge notching on the lip, one of them has scoring under that, the other starts a shell-edge impression motif. The third piece has two rows of LM-5 on the lip interior, with scored vertical lines running down the front. A fourth piece has three rows of wavy-bands on the lip, and a diagonal scored motif on the body. These traits are similar to those of the Nissan *Minor Division* and the sherds have been classified in the *Broad Comb-Scoring* group.

6. Two sherds (fig. 13f) have lip profiles which are angled in the front and at the top. They have vertical scoring running down the front vessel wall and wavy-scoring on the angled front and top of the lip. On the basis of the scoring technique and the motif variation the sherds have been ascribed to the *Wavy-Scoring* group.

7. One sherd has an unmodified lip and a profile of the LP-6 class (fig. 13g). The scoring on the body takes the form of large diamonds, with evidence of a series of V-like motifs incised in the interior of one of the diamonds. Considering the lip profile and scoring technique, the piece has been classified in the *Broad Comb-Scoring* group.

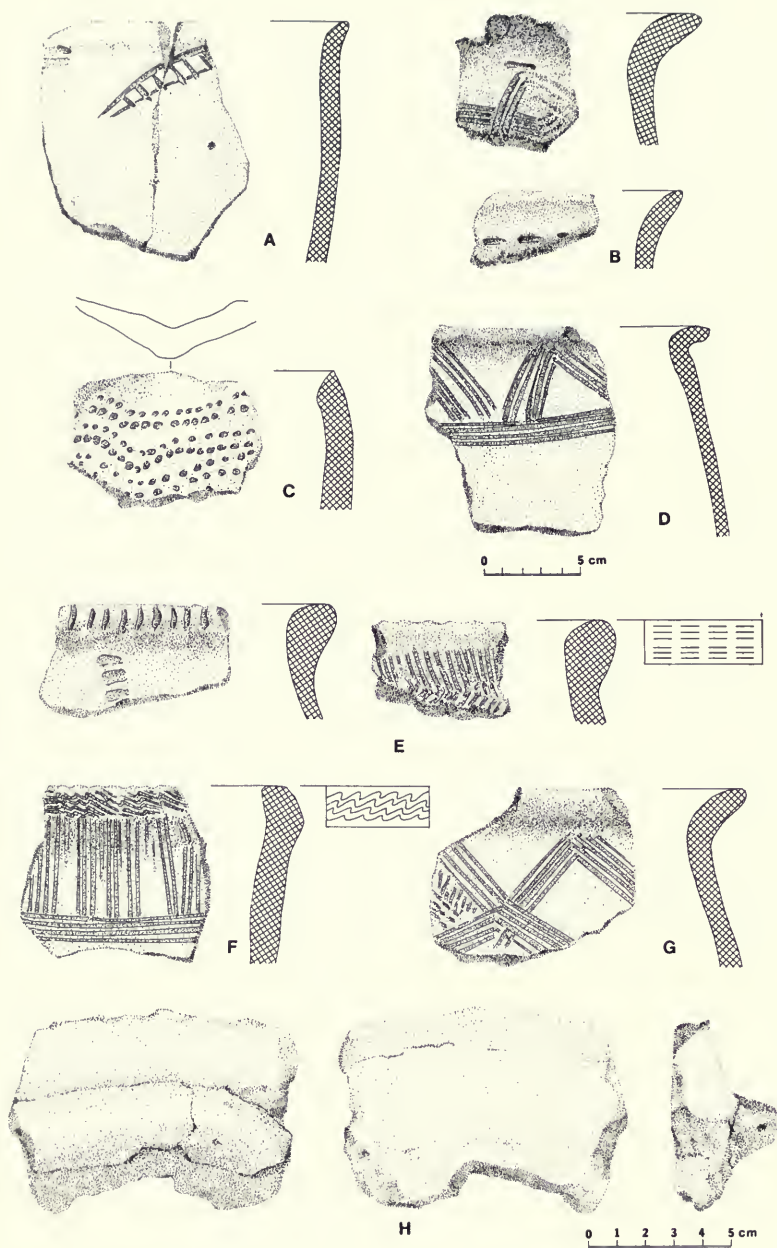


FIG. 13. Sherds from Nissan Island exhibiting rare ceramic attributes.

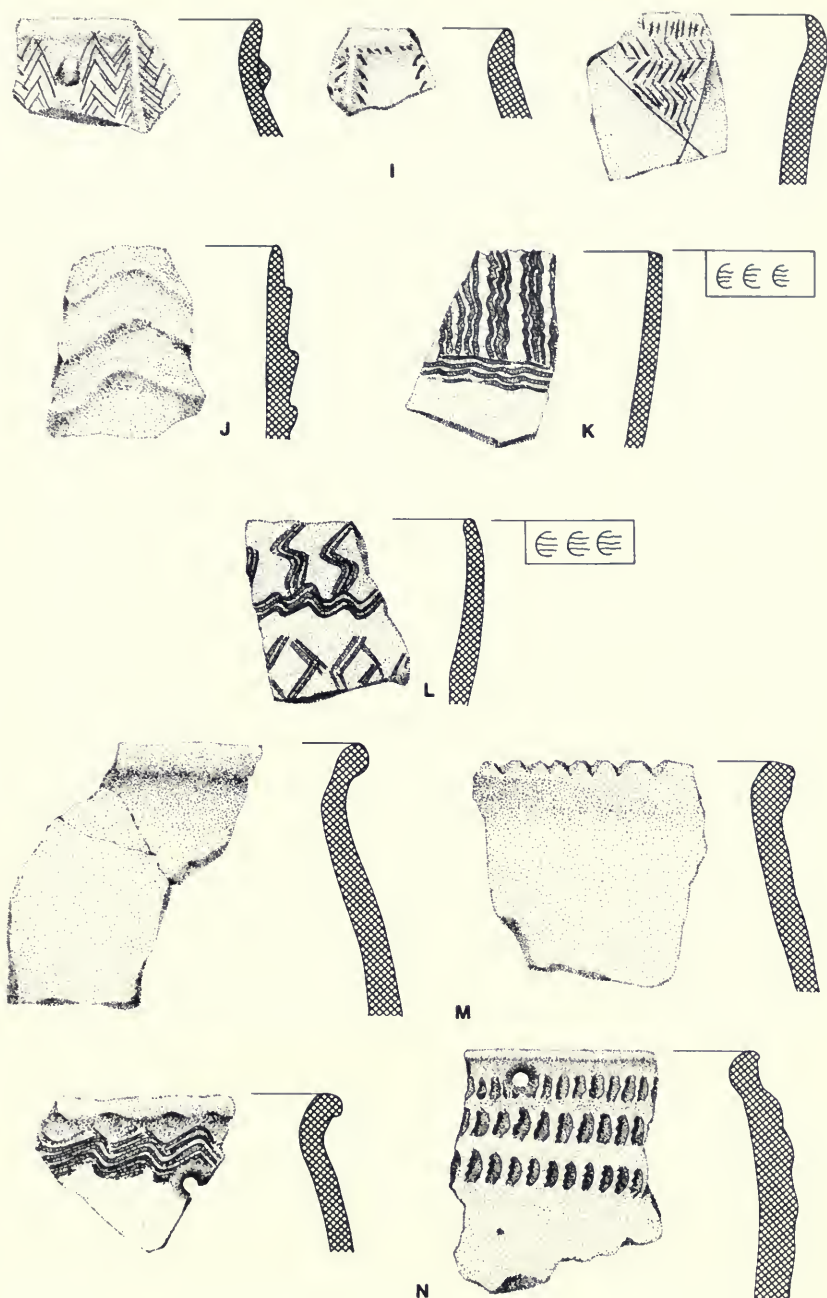


FIG. 13. (continued)



8. There is a crude, thick piece of pottery in the collection (fig. 13h). It consists of two clay pieces, one forming a large band which seems to curve. There is no way to orient the piece, it could be a foot or a handle, if it is part of a pottery vessel. This sherd is unlike any in the collection both in appearance and in paste.<sup>1</sup> It has been submitted to a geologist for examination of the clay materials, in hopes of being able to determine the source of the piece, which seems to be non-Buka, for its origin may be important in re-constructing the external contacts of the Nissan islanders.

9. Although rare, three sherds in the collection may be of importance, for they may be evidence of the existence of pottery trade from Buka to Nissan pre-dating the era of the *Malasang Style*. The three sherds are quite similar to sherds from the Buka *Hangan Style* (fig. 13i), two of them having the raised rib characteristic of the Buka *Hangan Punctate and Relief* sub-style (Specht, 1969, pl. XI-25), with small feather-like incised lines running along the rib. One of the sherds has a single knob similar to those found on pieces illustrated in Specht's (1969) Plate XI-26. The third piece has an inverted lip and the same delicate incised detail found on the other two pieces. The thin incised lines which form a crossed-over border are similar to those illustrated in Specht's (1969, pl. XI-20) *Hangan Punctate and Incised* substyle, with a zig-zag pattern contained within this motif. If these are indeed sherds similar to those of the Buka *Hangan Style* then there is evidence in the Nachman Collection of contact between Buka and Nissan dating back A.D. 500, according to Specht's chronology. The significance of the rarity of such pieces in the collection is difficult to assess, as the methods used in collecting the Nissan specimens lacked important controls. However, if this collection is only a surface one, then it is possible that *Hangan Style* sherds in greater quantity may lie below ground level, and therefore the apparent rarity of such sherds in the Nachman Collection could be misleading.

10. Three sherds in the Nachman Collection have unnotched wavy-relief bands (fig. 13j). Specht (1969, p. 209) mentions the existence of similar sherds in his discussion of the *Mararing Style*, noting that in the Buka excavations such sherds were often found along with sherds having relief and incised lines or shell-edge

<sup>1</sup>In the petrographic report, "Sand Tempers in Sherds from Nissan" (Dickinson and Kaplan, *in preparation*), Dickinson reports that the temper present in this sherd is unlike the two temper types he identified in 11 other Nissan sherds. Indeed, the temper is unlike any he has examined to this date from Buka or Bougainville.

notched relief. In one plate (Specht, 1969, pl. XI-40) unnotched wavy-relief band sherds appear in the same category with sherds having notched-relief and everted lips, similar to those in the Nachman Collection LP-6 class. On the basis of the relief decoration and the common lip profile it seems reasonable to classify the unnotched wavy-relief decorated pieces in the *Broad Comb-Scoring* group.

11. Twenty-nine sherds in the Nachman Collection are identical to those of the *Buka Modern Style*, still alive today. They exhibit decorative motifs BM-6 and BM-10 (fig. 13k) which are similar to those motifs illustrated for the *Modern Style* by Specht (1969, pl. X-21 and X-27). Twenty-three of the sherds have simple LP-1, six have inverted LP-7, seven have no lip decorations, four have LM-4, 18 have LM-6. Interpretation of these specimens is difficult for two reasons. The scarcity of *Modern Style* sherds in the Nachman Collection is not a result of their scarcity on the island, but rather of the collection methods. Nachman (Nachman and Terrell, pers. comm., 1971) reports having specifically rejected "recent pieces" that were brought to him. His rejection of such sherds has obviously weighted this study in favor of older materials. In addition, the distinction made by Specht between *Recent* and *Modern* style sherds is a problem. Nissan sherds of the BM-6 and BM-10 classes are similar to *Buka* sherds which Specht has classified as *Modern Style* pieces. The motifs are bordered by a wavy-scored band of the BM-1 class. Nissan motifs BM-11, BM-12, BM-13, BM-16, and BM-17 have this same basic layout. The possibility that better stratigraphic information might reveal that *Buka* sherds with motifs similar to the five just listed belong to the *Modern* rather than to the *Recent Style*, or some transitional phase therein must be raised. Such a possibility is further suggested by Specht's (1969, p. 211) statement that "with the exception of M-113 [Specht's code for BM-1], all [other motifs of the *Recent Style*] are found only in surface collections."

12. One sherd with attributes LP-7 and LM-6 exhibits two decorative body motifs, one under the other (fig. 13l). Near the lip appears BM-11, and under this motif appears BM-5. The sherd has been classified with the *Wavy-Scoring* group.

13. There are 15 sherds which have no body decorations (fig. 13m), they all have everted lips. Six of them have no lip modifications, five have LM-2, one has LM-3, one has LM-4, one has LM-5, and one has a chevron pattern on the lip. The lip profile identifies

the sherds with the *Broad Comb-Scoring* group, as does the lip modification range. In reference to the *Broad Comb-Scoring, Shell-Edge Impression* relationship, the sherd with the everted lip (LP-6) and the shell-edge impression lip modification (LM-3) is of importance, as it shares attributes distinctive of groups which Specht believes are unrelated.

14. The collection contains 11 sherds which have, in each case, a hole near the lip or a broken edge (fig. 13n). These perforated sherds represent the *Broad Comb-Scoring, Shell-Edge Impression, Stick Punctuation*, and *Modern* groups. The lip profiles, lip modifications, and body motifs are in keeping with the attributes one would expect to find by looking at the body decoration techniques; the broad comb-scored sherds have everted lips, etc. Two of the sherds exhibit evidence of drill work, aborted when the holes, which were being drilled from both exterior and interior, did not meet. Gifford and Shutler (1956, pp. 71-77) mention two types of holes found in New Caledonia pottery. In one instance the holes have been cut out of wet clay and are probably designed for suspension; in the other case, holes were used apparently for mending, and were created by drilling into fired clay. The sherds come from different collection points, represent different style groups, and none of the pieces can be joined. Thus, it is not possible to know if these sherds are parts of mended pots. Other than this attribute, these sherds exhibit attributes not unfamiliar to descriptions of Nissan sherd groups.

## RELATIONSHIPS AMONG CERAMIC GROUPS

One of the immediate objectives of this style analysis has been to discern whether the Nachman Collection exhibits a continuous style development, or whether major correlations between groups are impossible to make. For this reason line graphs will now be used to compare the attributes of the four groups under discussion. These line graphs (fig. 14) trace the patterns created when mapping the frequency level of each attribute in each group. Each individual attribute then emerges as a pattern. The assumption made is that attributes which persistently appear, attributes exhibiting patterns of relatively smooth declines and rises, and the co-existence of attributes, are possible indications of a continuous ceramic sequence. On the other hand, frequency patterns which display abrupt abandonment or displacement of attributes could be indicative of a broken sequence or of the influence of another ceramic tradition.

While it has been established that the *Stick Punctuation* and *Shell-Edge Impression* categories represent one group, they are graphed

separately, because in grouping them together their number was so large percentage values would be distorted, giving the graphs misleading patterns. The groups have been tentatively arranged in the order *Broad Comb-Scoring*, *Stick Punctuation*, *Shell-Edge Impression*, and *Wavy-Scoring*, each category corresponding to the style of Buka ware most similar to it, and set out in the chronological order suggested by Specht.

Examination of the graphs will reveal that the four groups being considered have a number of attributes in common. All groups share the wavy-band decoration (BM-1), simple LP-1, channeled LP-5, and inverted LP-7. Undecorated lips occur in all categories, as do lips decorated with shell-edge notching (LM-3) and wavy-scoring (LM-4). The tabulated data used to construct the graphs reveal that BM-1 dominates all groups, never appearing in less than 50 per cent of the pieces. LP-1 also dominates all of the groups. LP-5 was so minor a lip profile numerically, it could easily have been dropped, yet it appears in all categories.

The attributes which remain relatively constant in each group, and for the most part dominate all the collections, are mapped on Graph A. On Graph B are plotted attributes which decrease in frequency, while Graph C plots attributes which increase in frequency. On Graph D are attributes confined to a single group. Graph E plots the attributes important to the *Broad Comb-Scoring* and *Wavy-Scoring* groups, but not to the *Stick Punctuation* and *Shell-Edge Impression* groups. Graph F plots the attributes shared by the *Broad Comb-Scoring* and *Stick Punctuation*, *Shell-Edge Impression* groups, while Graph G plots those shared by the *Wavy-Scoring* and *Stick Punctuation*, *Shell-Edge Impression* groups.

All the graphs demonstrate that there are no lip profiles and no lip modifications which are exclusive to only one style. Further, body motifs which are *not* shared are, for the most part, variations of the wavy-band theme (BM-1), and most of these unique motifs have been classified in the *Wavy-Scoring* group correlating to the *Buka Recent Style*, a style for which revisions in classification have been suggested.

Graph B illustrates that LM-5 and LP-6, attributes which are diagnostic of the *Broad Comb-Scoring* group, decrease in numbers from group to group, while Graph C demonstrates that attributes LP-2 and LM-6, diagnostic of the *Wavy-Scoring* group, increase in numbers. Both sets of attributes are present in the *Stick Punctuation* and *Shell-Edge Impression* groups. The notched lip modification

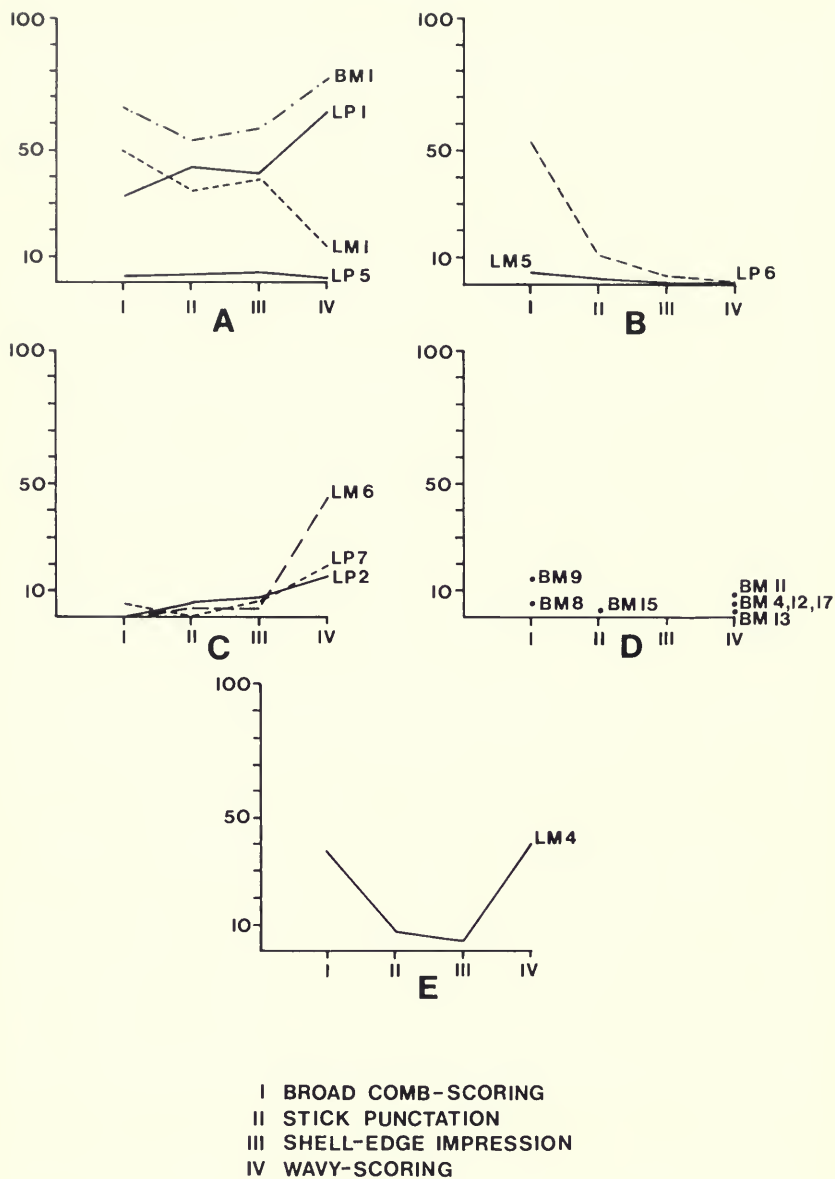
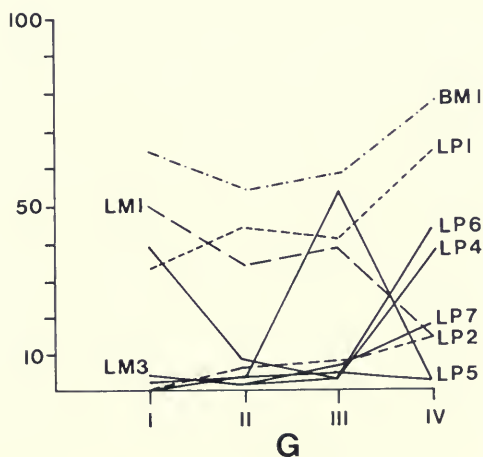
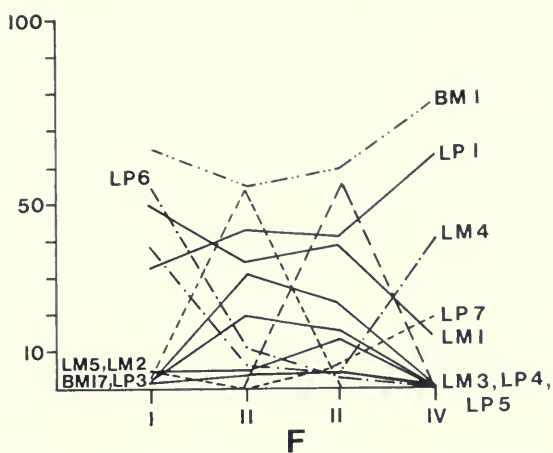


FIG. 14. Graphs showing the similarities and differences among the major sherd groups.





- I BROAD COMB-SCORING
- II STICK PUNCTATION
- III SHELL-EDGE IMPRESSION
- IV WAVY-SCORING

FIG. 14 continued.

represented by LM-2 and LM-3, important traits of *Stick Punctuation* and *Shell-Edge Impression*, are found in the *Broad Comb-Scoring* group. While sharing of attributes between groups has been discussed earlier in this paper, Graphs B and C show an increase and decrease of attributes in progression, suggesting that this is indeed an unbroken sequence; a conclusion which is contrary to that which would be derived from Specht's Buka analysis.

As stated earlier, in view of historical evidence of pottery trade between Nissan and Buka, and the similarities of motif and decorative techniques between sherds found in the two areas, sometimes to the point of almost exact duplication, it seems to be possible to assume that the Nissan materials should reflect the nature of the Buka ceramic sequence.

An important point in Specht's (1969, p. 321) reconstruction of Buka pre-history is his proposition that the *Mararing* ceramic style, the beginning of which he dates to A.D. 1000-1200, displays attributes dissimilar to those of the *Malasang Style*, and must therefore be the work of a people new to Buka Island. Having stated that the shell-edge impression technique is indicative of this displacement, Specht (1969, p. 310) specifically observes: "Many other elements typical of the *Mararing Style* cannot be derived from the preceding ceramics." He argues that these elements are ones such as the *kepa* form, a tempering material unique to the *Mararing Style*, a red earthen pigment, and grinding stones and anvils.

Graph E charts attributes which fit the abrupt pattern implied by Specht's statement that the *Malasang* and *Recent* styles contain a temper not found in the *Mararing Style*, and use a similar exclusive decorative technique, comb-scoring. The implication to be drawn seems to be that the people responsible for the *Mararing Style* altered the existing ceramic traditions of Buka and changed the temper source, and that the *Recent Style* to some extent reflects a swing back to the *Malasang Style* traditions.

Graph E charts all attributes important to the *Broad Comb-Scoring* and *Wavy-Scoring* groups corresponding, as argued, to the Buka *Malasang* and *Recent* styles, but not those of the *Stick Punctuation* and *Shell-Edge Impression* groups which correspond to the Buka *Mararing Style*. LM-4 is the only attribute which follows the pattern described above, and it is present in the Nissan groups which represent the Buka *Mararing Style*. As with other lip modifications, LM-4 generally follows the correlation that the tool technique used to decorate the body is also that used to decorate the lip

profile; therefore its pattern behavior is not unusual, and cannot be considered diagnostic of the pattern that Graph E was to trace. In addition, while the *Broad Comb-Scoring* and *Wavy-Scoring* groups have much in common, they each have a dominant lip profile not shared by the other group, everted LP-6 and bevelled LP-2.

Graphs F and G demonstrate the large number of attributes which are shared by the *Broad Comb-Scoring* and *Stick Punctuation*, *Shell-Edge Impression* groups, and the *Wavy-Scoring*, and the *Stick Punctuation*, *Shell-Edge Impression* groups. If the *Buka Mararing Style*, which corresponds with the *Stick Punctuation* and *Shell-Edge Impression* pieces, was intrusive, it would be reasonable to expect that more attributes shared by the *Malasang* and *Recent* styles would exclude the *Mararing Style*, and this is clearly not the case. In sum, the attributes under analysis in the Nachman Collection do not follow the pattern which Specht's conclusions would have them exhibit.

It has been pointed out that the groups represented on the line graphs are set up according to Specht's chronology: *Broad Comb-Scoring*, *Stick Punctuation*, *Shell-Edge Impression*, and *Wavy-Scoring*. The attributes plotted on Graphs B and C climb and decrease with clear smoothness when the groups *Stick Punctuation* and *Shell-Edge Impression* appear in this order, rather than with the *Shell-Edge Impression* group coming first. However, the close matching of attributes of the *Mararing*-like groups has been discussed, and there seems to be no doubt that they represent the same style. Yet this pattern is intriguing, and it indicates that the temporal relationship between the *Stick Punctuation* and *Shell-Edge Impression* ware can probably only be determined with the aid of further stratigraphic information.

## SITES

Sites have been neglected throughout most of this paper. In terms of individual collection areas only locality No. 47 proved significantly different from the others in sherd content, yielding a high concentration of LP-6. The description of individual styles given earlier in this paper included the percentages of concentrations for given sites. The *Broad Comb-Scoring* group peaks at Balil, the *Stick Punctuation* and *Shell-Edge Impression* groups again stayed together in this comparison, peaking at Siar, with an extremely high concentration of *Shell-Edge Impression* ware (57 per cent) found there. The *Wavy-Scoring* group peaks at Sirot Island. The absence

of controlled collecting practices leaves little room for speculation as to the Nissan settlement patterns. However, all major site areas have yielded sherds from the four major groups being discussed in this work.

## STYLE ANALYSIS SUMMARY

This style analysis of ceramic materials in the Nachman Collection was undertaken to describe the collection and provide an understanding of the nature of attribute similarities and variations within it. In addition, it was considered likely that such information could, in turn, a) be used to test the findings of Specht's Buka ceramics analysis, and b) might furnish insights into the role played by Nissan Island in the regulation of population interaction between New Ireland and the Solomons. Before turning to the latter issues the results achieved for the first will be summarized.

The immediate objectives of the style analysis were to discern whether the Nachman Collection presented evidence demonstrating a continuous stylistic development in ceramic vessel form and decoration, therefore suggesting unbroken cultural continuity on the island; or whether significant dissimilarities between sherds would emerge, suggesting that the collection contained evidence of pottery vessels which were created by people having different ceramic traditions, and by implication different cultural traditions, thereby raising the question as to the source of culture contact.

As a result of the style analysis, 29 sherds have been identified as similar to those of the Buka *Modern Style*, thus confirming the reports of historic pottery trade between Buka and Nissan. Furthermore, the analysis has isolated three sherds which bear strong resemblance to the sherds of the Buka *Hangan Style* which, according to Specht's chronology, directly preceded the *Malasang Style*. If these sherds are correctly assigned to the *Hangan Style*, then the trade of pottery vessels to Nissan from Buka may date back at least as far as A.D. 500.

Examination of the Nissan findings suggests that the dominance of the wavy-band motif theme (BM-1), the continual use of the shell tool, and the continuity and overlapping of attributes between the ceramic groups discriminated in this analysis appear as compelling reasons to believe that there was a continuous style development in the pottery represented in the Nachman Collection, and by inference in the Buka ceramic tradition (fig. 15).

The Nissan sherds discussed, with one exception, have their counterparts in the Buka ceramics analyzed by Specht, and have been

assigned to Buka-like styles exclusively. The existence of a single non-Buka sherd, which has been described in *Miscellaneous*, both re-inforces the picture already suggested of trade activity between Buka and Nissan, and at the same time raises the possibility that Nissan interacted with populations residing somewhere other than Buka Island.

### THEORETICAL ANALYSIS

A style analysis of the Nachman Collection has been set forth in this paper and several inferences have been drawn about the prehistory of Nissan Island from the evidence examined. Considering the paucity of current archaeological data on Nissan and her neighbors to the north and south, it would be difficult to explore further the role played by Nissan in local trade and culture contact between New Ireland and the Solomons using archaeological information alone. It is possible, nonetheless, to anticipate briefly what future archaeological research in this part of Melanesia may reveal by turning to a theoretical approach, and by asking: what is the most probable role of an island, such as Nissan, in the regulation of trade and communication between the Bismarck Archipelago and the Solomon Islands? It will be possible to assess, to some extent, the worth of theoretical statements made in answering this question by comparing them to ethnohistorical accounts. In addition, a conjectural look at Nissan's role in the history and patterning of local trade and contact should give a perspective on where and why future archaeological work should be done in the area.

A theoretical approach will not be as difficult as it might at first seem, for, as John Terrell (1974) has pointed out, there is a considerable body of theory, created by biogeographers, on the role of stepping-stone islands, such as Nissan, in regulating the frequency and extent of species movement between major island regions. In addition, a number of hypotheses and models dealing specifically with the spatial behavior of human populations have been developed by human geographers. While biogeographers have concerned themselves primarily with the behavior of non-human populations, and

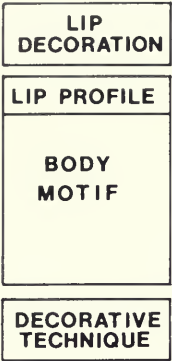
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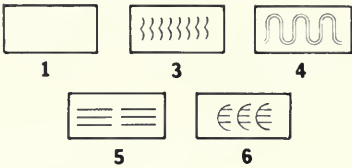
FIG. 15. Proposed major known phases in the Nissan Ceramic Sequence, illustrating the continuous use of the wavy-band motif and shell decorating tools, as well as the sharing of attributes among the recognized sherd groups. [Note: sherds with stick punctuation are not figured in the diagram; their place in the sequence corresponds with that of *Shell-Edge Impression* sherds.]



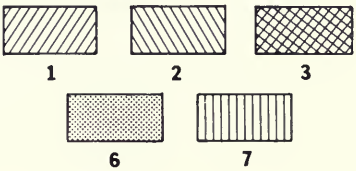
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Lip Decorations



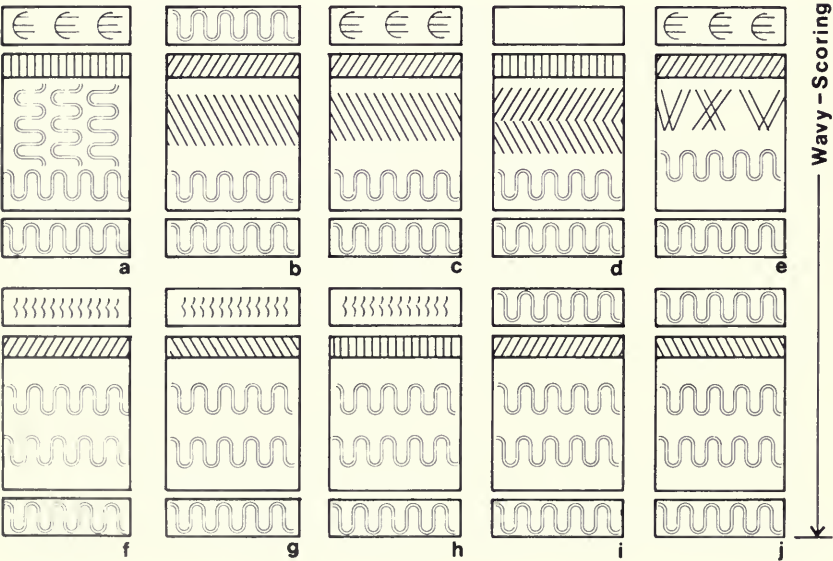
Lip Profiles

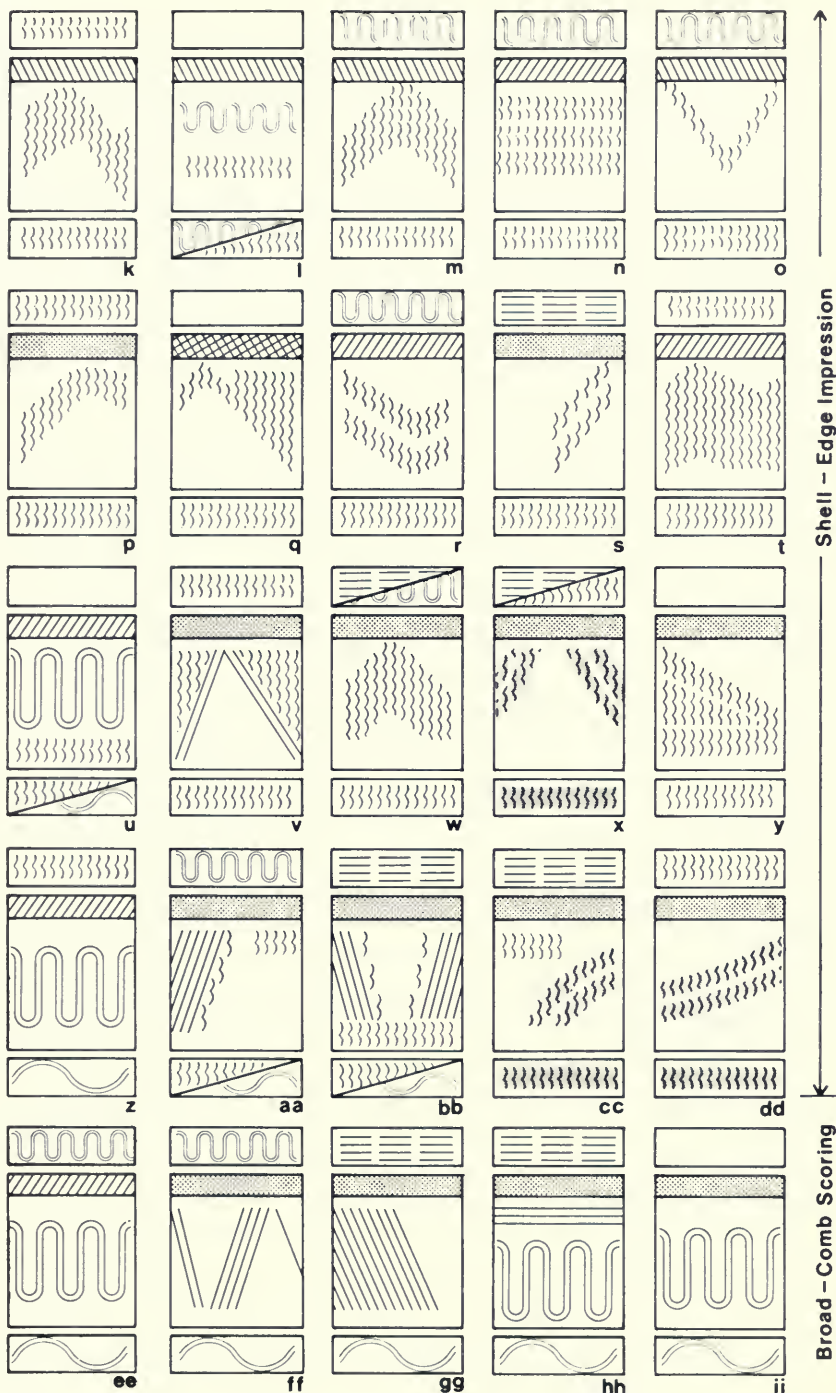


Decorative Techniques



SEQUENCE:





human geographers, for the most part, deal with complex industrial societies, these two professions have in common a concern for the development of models to define the spatial behavior of populations. Their achievements, notably the "gravity model" of human interaction developed in locational and economic geography and the stepping-stone models devised by MacArthur and Wilson (1967), may be taken to develop a theoretical understanding of Nissan's place in inter-island migration, trade, and cultural contact.

## INTERACTION MODELS IN GEOGRAPHY AND BIOGEOGRAPHY

The gravity model in geography and the stepping-stone models of MacArthur and Wilson are founded on similar assumptions about the spatial behavior of organisms. The gravity model, adopted from physics and used widely by social scientists (Carrothers, 1969, p. 226), assumes that the size or "mass" of a population creates an "attractive force," and that the attraction (i.e., the interaction) between two human populations increases as the product of their masses increases, and decreases inversely as the distance which separates them increases (Chorley and Haggett, 1967, p. 559; Carrothers, 1969, pp. 226-227). Stepping-stone models in biogeography are built on similar assumptions that distance and island width (the latter used as an index of island area) are important factors in determining the frequency and ratio of animal and plant species exchange between islands of differing size and distance from each other. Since MacArthur and Wilson have dealt directly with the effects of islands on the transmission of species from one area (the source area) to another (the recipient area), what these two ecologists have to say about stepping-stone islands is particularly useful in developing a theoretical perspective on the role of stepping stones in human interaction.

MacArthur and Wilson (1967, pp. 132-133) have isolated four variables of major importance in determining the impact of stepping-stone islands on species exchange: 1) the average dispersal distance of a species; 2) the method of dispersal (active or passive); 3) the strategy used by a species for colonizing a new area; and 4) the size, location, and distance of the source area, the recipient area, and the stepping stone. Essentially, the presence of a stepping stone is of greater importance to species that tend to have active rather than passive dispersal patterns and to species that have restricted dispersal distances. MacArthur and Wilson (1967, pp. 132-

133) conclude that for most species "dispersal across gaps of more than a few kilometers is by stepping stones wherever habitable stepping stones of even the smallest size exist." These observations suggest that stepping-stone islands are also important in patterning human interaction, because man actively disperses and, at least according to the gravity model of interaction in human geography, the distance man is most likely to travel is minimized in the interests of economics and efficiency.

While, in general, stepping-stone islands facilitate species dispersal, their presence between source regions is not totally favorable to dispersal. MacArthur and Wilson (1967, p. 119) point out that when stepping stones are small in size, they create a strongly competitive situation among migrating species in which the strategies of colonization and exploitation used by rival species are extremely important. Since the area of a stepping stone limits the total number of species which can survive on it, stepping stones act, through competitive exclusion, to "filter out" species from the migrating pool. Thus, not all species that leave a particular source region are successful in reaching a given recipient area.

There appear to be human parallels between the species-filtering effect of stepping-stone islands and the observable impact of small islands on trade and movement between cultural regions. Each island or village community in a trade network, for instance, may affect the transmission of trade goods, through partial or total alteration or consumption at each point of transaction along the network.

In developing a general theory of stepping-stone islands, MacArthur and Wilson construct several hypothetical island situations of differing complexity. Their most elementary stepping-stone model is one in which a single intermediate island is located between two areas. They (1967, pp. 136, 144) demonstrate mathematically that a single stepping stone, regardless of where it is located between two areas, will affect the frequency (i.e., probability), but will not alter the proportion of species exchanged between the two areas. Their (1967, p. 136) more elaborate models, containing a number of stepping stones reveal, on the other hand, that two or more stepping stones, if colonized in succession, can increase not only the frequency but also the proportion of exchange between two areas, favoring the closest source region.

MacArthur's and Wilson's more complex models best fit the New Ireland-Solomons situation, because the primary centers of human settlement in the region are on Buka (20 people per sq. mile) and



along the northeastern coast of New Ireland (15-20 people per sq. mile). Since the southern New Ireland area is very sparsely inhabited (1 person per sq. mile), the small islands off the New Ireland coast, together with those between New Ireland and Buka, are, in effect, an intermediate archipelago between northern New Ireland and Buka (*data from*: Brookfield with Hart, 1971, p. 74). In view of the northern location of the major concentration of people on New Ireland, it seems likely that the small coastal islands affect not only the frequency of interaction between Buka and New Ireland, but also that the flow of ideas, trade goods, and people is greater from New Ireland to Buka than the reverse, because these islands are nearest to New Ireland.

This brief consideration of the function of stepping-stone islands in species dispersal and the likely parallels which might be drawn to human movement and interaction indicates that the theoretical question raised earlier about Nissan's role in island trade and communication should be rephrased as follows: first, to what extent has the presence of Nissan as an island intermediate between New Ireland and Buka served to increase the likelihood that trade goods, ideas, and people might travel between these two regions? And second, in what ways has Nissan acted as a "filter," or regulator, influencing the transmission, or "dispersal," of trade goods, ideas, and people between the Solomons and New Ireland?

These questions might be resolved a) by undertaking an investigation of ethnohistorical accounts, for they may contain sufficient information to answer such questions, or b) by referring, as has already been implied, to theoretical biogeography, and by noting parallels between human movement and dispersal of species via stepping stones.

While either approach would entail an extensive treatment in its own right, it is worthwhile to take a look at each in order to determine how fruitful they might be for future research. Since any claims made on the basis of theoretical formulations are subject to at least partial testing against historical evidence, it is appropriate to start with a theoretical analysis of the actual complex island situation in the Nissan region and then see how well that analysis can stand up to ethnographic scrutiny.

## THEORETICAL INTERACTION STRUCTURE

Important variables in the stepping-stone models of MacArthur and Wilson are measures of island area and distance between islands, or between islands and nearby mainland regions. These



variables are comparable to the distance-mass figures used to construct gravity models in human geography. These same simple variables have been used by Terrell (1974, pp. 32-33) to construct a realistic model defining the probable interaction structure of the islands in this region of the Pacific.

In order to construct the network paths depicted in Figure 16, Terrell found it necessary to simplify the geography of these many islands by substituting single points for small islands, and by reducing larger islands to roughly straight lines, each defined by a mid-point and two end-points at the farthest extremes of the island (a simplification quite similar to the island-width variable employed by MacArthur and Wilson). He constructed the hypothetical network shown in the figure by assuming that all the points thus located have equal status, and by then connecting each point to the three others nearest to it. This last step was done on the assumption, already noted for the gravity model and the stepping-stone models, that the probability of interaction between two points decreases with distance; the three nearest points therefore represent the locations most likely to be contacted from each point of origin.

The resulting point-and-line structure depicts schematically the most likely routes of trade and movement among the islands, assuming, of course, that the variables used are in themselves adequate predictors of human interaction patterns, and that the simplifications Terrell used in finding out where to locate the points have not distorted geographic reality too severely. Parenthetically, it should be added that frequency predictions of the kind generated by the gravity models of human geographers are not fundamental in Terrell's proximal-point model. This is so, not because frequency of inter-island movement is unimportant in human interaction, but simply because it would be difficult, if not impossible, to interpret frequency estimates, considering the paucity of ethnographic and archaeological information on actual rates of trade, social contact, and warfare expeditions over any given unit of time.

### SOME PREDICTIONS

If Terrell's model is worthwhile, the network diagram may be used to make detailed predictions about specific patterns or routes of inter-island movement in the region encompassing New Ireland and Buka, and it should be possible to verify such predictions with field or experimental evidence. According to Terrell's model:

- (1) Tabar islanders have their most immediate contacts with the Lihir islanders and with the people of the Lesu mainland coastal region;

(2) Lihir islanders interact most often with the Tabar and Tanga islanders and with the people in the general vicinity of the northern Namatani coastal area;

(3) Islanders of Tanga may be expected to interact with those of Lihir and Feni, as well as with the populations of the Namatani and Muliama mainland areas;

(4) Feni islanders maintain contact with Tanga and Green islanders and with the people of Muliama and Siar; and

(5) Green islanders interact most directly with the Feni islanders and with the people of Buka.

In an effort to explore the validity of these predictions, they will be compared with known historical patterns of trade and voyaging. If they survive comparison, implications may be drawn from them which may be applied to the theoretical questions under scrutiny. These results might, in turn, be used to design research strategies in the Nissan region.

## ETHNOGRAPHIC EVIDENCE

There is sufficient ethnographic information concerning native travel and commerce in the northern Solomons and New Ireland with which to pin-point local trade routes. The movement of different kinds of goods is summarized in Figure 17, and the interaction routes documented by this trade are reconstructed in Figure 18. Before comparing the network based on ethnographic evidence with the proximal-point network, however, some important observations must be made concerning trade in this area.

The ethnohistorical literature indicates that trade goods were handed along from trader to trader in the native trading systems of this part of Melanesia without their original owners or producers accompanying them very far, if at all. There is no mention in the literature consulted that a single individual or organization directed the flow of goods from producer to final purchaser. Rather trade in this part of Melanesia involved direct reciprocal exchanges. For example, *beroan*, a shell money known historically to be important on Buka, and manufactured in New Britain and New Ireland (Blackwood, 1935, p. 447), found its way down to Buka and Bougainville, not by a process of long-distance voyaging, but rather through a series of inter-locking short trading voyages, each between two neighboring areas. Similarly, clay pipes, manufactured on Buka, reached at least the Tanga Islands in a comparable fashion (fig. 16) (Bell, 1950, p. 96).

Parallels noted earlier between the "filtering effect" of stepping-stone islands on species migration, described by MacArthur and Wilson, and the absorption or transmittance of trade items by populations located along the New Ireland and northern Solomons

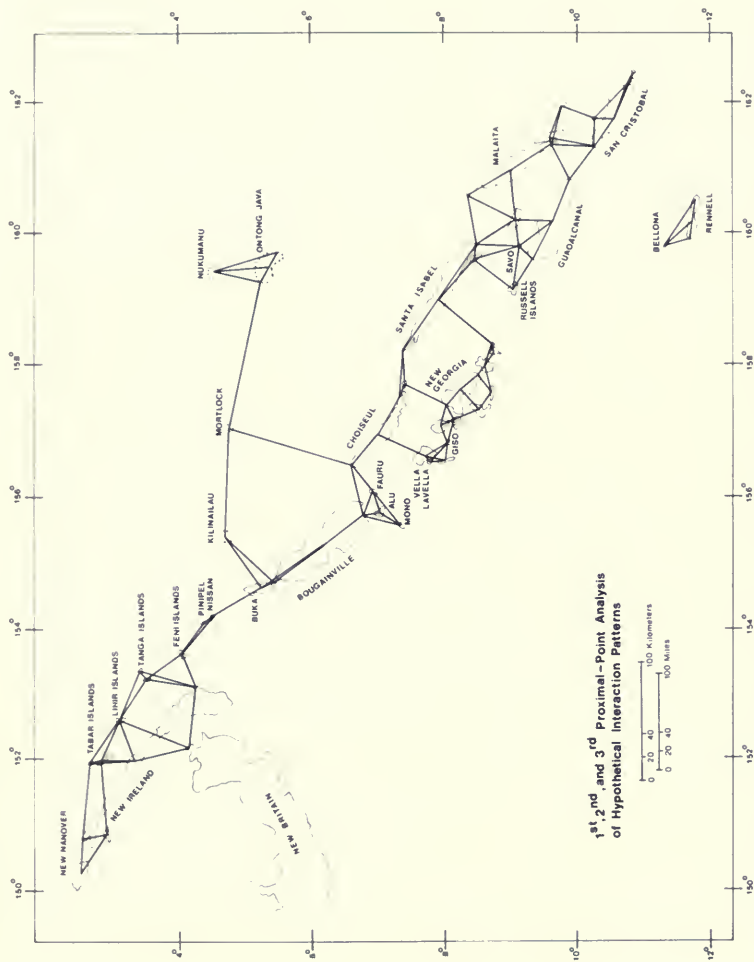


FIG. 16. A proximal point interaction network constructed for the islands in the North Solomons-New Ireland region (after: Terrell [1974, fig. 2]).

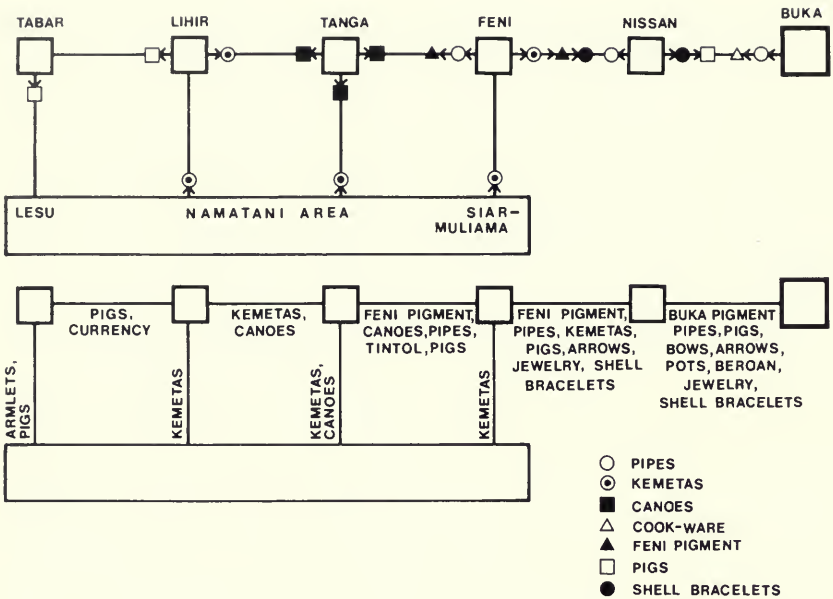


FIG. 17. The movement of trade goods between New Ireland and the Solomons, as reported in the ethnographic literature.

trade routes can be found in the ethnographic literature. For example, *beroan*, a durable commodity used as a currency of exchange, was traded down through New Ireland, ultimately reaching at least Buka. In contrast, archaeological and ethnographic information suggests that Buka cook-ware was rarely traded beyond Nissan, this breakable household commodity being almost entirely consumed by the Nissan islanders.

The absence of directed long-distance marketing of goods led to the important circumstance where Nissan had a unique role among the islands in the area in that trade goods from both New Ireland and the Solomons were directly exchanged there, after being brought to the island by Buka and Feni traders.

## COMPARISON

Proximal-point analysis predicts direct interaction between island populations and nearby mainland populations, when there are no habitable intermediate islands, and direct inter-action between neighboring island populations. Comparison of Terrell's theoretical network (fig. 16) with that reconstructed from the ethnographic literature reveals a striking correspondence between the two. There

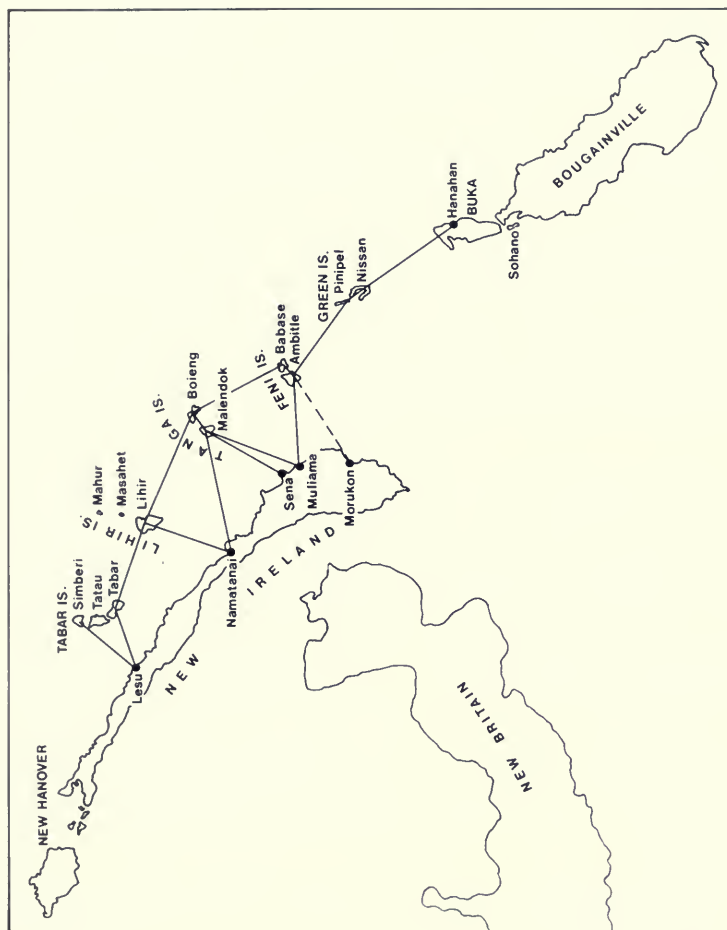


FIG. 18. Reconstructed trade connections between New Ireland and Buka from information in ethnographic reports.



is no instance of long distance, directed trade bypassing stepping-stone islands. Rather, as predicted, trade goods pass along from island to neighboring island or nearby mainland area. Thus, at least with respect to trading patterns, the similarity between the proximal-point model and attested reality suggests that variables as elementary as those used in biogeography to develop stepping-stone models rather successfully predict patterns of island interaction between human populations in the New Ireland-Solomons region.

The ethnographic evidence and the predictions based on biogeographical theory together present a picture where direct cross-cultural contact between New Ireland and the Solomons is confined to small intermediate islands, and where the impact or result of such exchanges is regulated by or "filtered through" a number of resident island populations by means of a series of short interlocking voyages. These circumstances are probably sufficient to explain a seemingly contradictory situation: although New Ireland and the Solomons are involved in trade with one another, they remain, nonetheless, culturally and linguistically distinct.

### CONCLUSIONS

Nissan Island is located, along with Pinipel and the Feni Islands, between New Ireland and Buka. Geographically, Nissan is a probable stepping stone for travel, trade, and cultural exchanges between the Bismarck Archipelago and the Solomons. Yet, paradoxically, the peoples of these two regions are reportedly dissimilar in appearance, culture, and language. This paper has dealt largely with questions concerning the manner in which, and the extent to which, Nissan has influenced the frequency and ratio of interaction between populations resident in the New Ireland area and on Buka, and therefore has regulated the evolution and maintenance of cultural similarities and differences between these two major archipelagoes.

Historically, it is well attested that trade and culture contact between New Ireland and Buka have taken place via Nissan, Pinipel, and the Feni Islands. The archaeological analysis of pottery sherds from Nissan, collected in 1971 by Steve Nachman, has led to the conclusion that there is an unbroken record of stylistic developments within the ceramics of Nissan continuing through several style phases. Furthermore, all the Nissan sherds studied, with one exception, may be assigned to Buka Island pottery styles previously analyzed and reported by Jim R. Specht. The numerous

attribute similarities, sometimes to the point of exact duplication, between the prehistoric and modern pottery of Buka and the ceramics of Nissan may be taken to infer that the pottery trade between these two islands, described in the ethnohistorical literature, has been carried out at least since circa A.D. 500.

The isolation of one pottery sherd which cannot be assigned, either stylistically or by clay source, to the Buka pottery tradition is an indication of the known historical fact that Nissan islanders have also been engaged in trade and inter-action with areas other than Buka, a possibility further supported by the recovery of Buka-like potsherds from the Feni Islands and the southern coast of New Ireland.

Thus there is some indication that known historic patterns of interaction between New Ireland and the Solomons via Nissan developed during the prehistoric past over a period of more than a thousand years. This observation makes the second question explored in this paper all that more important. If trade between Buka and New Ireland has so great an antiquity, why are the peoples of the Solomons and the Bismarck Archipelago not more similar to one another culturally and linguistically?

Considering the current limitations of archaeological knowledge on the Southwestern Pacific, it is not yet possible to resolve this second question with the aid of archaeological information. Reference, however, can be made to recent advances in biogeography and human geography and also to ethnographic records, in order to develop an initial perspective on the probable role played by a stepping-stone island, such as Nissan, in regulating the frequency and impact of trade and culture contact between the Solomons and the Bismarck Archipelago.

In particular, the stepping-stone models devised by the biogeographers MacArthur and Wilson to describe patterning in the dispersal of species between major source regions, and Terrell's proximal-point network model depicting probable routes of trade and interaction within and between New Ireland and the Solomons, have been used to arrive at a set of specific predictions about how the presence of small intermediate islands, such as Nissan, has structured interaction between New Ireland and Buka.

The MacArthur and Wilson island models and Terrell's network model assume that the simple variables of distance and island area may be used to predict the likelihood of dispersal or contact between island populations. According to this assumption, population movement is more likely to occur between near rather than far islands,

and between large rather than small islands. Furthermore, habitable islands, regardless of their size, which are located either between two islands, or between an island and a neighboring mainland, are unlikely to be bypassed, but rather utilized, by human populations and other species during dispersal or trade and travel. In addition, MacArthur and Wilson have observed that when these stepping-stone islands are small, they cut down on the number of species which will successfully reach a recipient area, because their size increases niche competition among species, with the result that some species are "filtered out" of the migrating pool.

A brief inquiry into the applicability of these observations to human population movement and contact has been undertaken by comparing the theoretical concepts to ethnographic accounts of trade and travel in the New Ireland-Solomons area. There is a close correspondence between the historically-known trade processes and those predicted on the basis of the proximal-point analysis and stepping-stone models. Historically, trade goods were exchanged in the New Ireland and Buka area by means of a series of short distance interlocking journeys between neighboring populations. This pattern of movement, coupled with the particular island geography of this region, resulted in a situation where goods traded between New Ireland and Buka usually moved through Nissan, Pinipel, and the Feni Islands, and were subject to consumption or destruction by the populations located along the trade routes.

In sum, it appears that in this region of the Southwestern Pacific man has been inclined to trade and travel only short distances to neighboring islands and nearby mainland areas, rather than undertake long-distance directed voyages. This pattern of restricted travel has led to the circumstance that while the New Ireland and Solomon Islands populations have exchanged goods, and to some extent have interacted, direct interaction between these populations has been restricted and the impact has been contained. Therefore, extensive cross-cultural influences have not been prevalent.

The archaeological evidence analyzed here may be taken to suggest that the Nissan islanders, and by implication, the Buka islanders, developed in their own fashion from at least A.D. 500 until European contact, without experiencing disruptions and sudden changes due to foreign invasions, migrations, and the like. The prehistoric evidence also seems to imply that trade between Buka and Nissan must be dated back also at least that far. There is a further indication that by A.D. 1000-1200 this trade might have involved parts of southern New Ireland.

Using biogeography theory and models, it has been possible to diagram likely routes and directions of human interaction in the Bismarck Archipelago and the Solomons. This theoretical picture is supported by ethnographic evidence and available archaeological information in no way conflicts with it. On the basis of these inquiries, it seems logical to propose that future archaeological investigations in the area will reveal few, if any, outside contacts in the form of large-scale migrations or invasions. Rather, the prehistoric picture likely to emerge should be one of contained, slowly evolving, local cultural development.

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